PERFORMANCE OF YANKASA RAMS FED TREATED AND UNTREATED SORGHUM STOVER WITH DIFFERENT SUPPLEMENTS

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ABSTRACT
An experiment was conducted to evaluate nutrient intake, digestibility and performance of growing Yankasa rams fed urea treated and untreated sorghum stover with supplementation. Twenty rams were randomly allotted to four dietary treatmentsin complete randomized design. Animals on treatment 1 and 2 were fed untreated sorghum stover while those on 3 and 4 were given treated sorghum stover. Treatment 1 and 3 were supplemented with cotton seed cake (CSC alone) while those on treatment 2 and 4 were supplemented with cotton seed cake and maize bran (CSC+MB 50:50) the experiment lasted for 63 days. The result indicated that urea treatment increased crude protein (CP) content of sorghum stover by 219% and decreased acid detergent fibre 21.57%. Significant (P<0.05) difference were observed in nutrient intake and growth performance. The result of dry matter intake (DMI) was higher in treatment 1 and lowest in 4 with (576.10 g/day and 513.64 g/day respectively). Live weight gain were significantly (P<0.05) affected by the treatments with treatment 3 having the highest value of 78.89g/day and treatment 2 the least 57.46g/day. Animal fed diet 3 utilized their diet much better compared to others. It may therefore be concluded that urea treatment and supplementation of sorghum stover can improve performance. However diet 3 which gave a better average daily gain is recommended for growing Yankasa rams.

Keywords: Sorghum Stover, Cotton Seed Cake, Maize Bran

INTRODUCTION
The utilization of the cheapest and most available feedstuff is a major challenge facing livestock farmers in Nigeria amidst feed crisis (Bogoro, 1997). These cheap feed resources include crop residues, agro-industrial by-products, animal processing wastes, brewery waste and by products, farm animal waste (poultry litters, animal faces) and other forms of fibre, protein and energy by products suitable for ruminant feeding. Crop residues contribute substantially to the supply of nutrients for animals in the tropical and sub- tropical developing countries. According to Fall *et al.* (1987) about 25% of cereal crops are retained in crop residues, making them valuable nutrient sources. The feeding value of crop residues especially cereals such as sorghum and millet has been largely ignored and this has resulted in development of crop varieties and hybrids that produce fewer residues than unimproved varieties and hybrids that produce fewer residues than unimproved varieties (Williams *et al.*, 1997), yet most important feeds for ruminants in small-holder crop-livestock production system of Asia and Africa. Thus, its importance in ruminant nutrition in the long dry season of semi arid areas needs not to be over emphasized despite its limitations. Cereals straws and other crop residues are characterized by low digestibility (< 50 percent), hence low metabolizable energy content (<7.5mj/kgdm), low crude protein content (<60g/kg Dm), low intake (10-20g/kg live weight daily) and low content of available minerals and vitamins (Nicholson, 1984, Doyle *et al.*, 1986). As sole feeds they are therefore, considered too poor,

even to maintain adult ruminant. In the continuous search for ways of enhancing the nutritional status of the crop residues, two methods are commonly employed, viz; supplementation with protein, mineral and energy sources as well as chemical treatment with urea, ammonia, sodium hydroxide, potassium hydroxide and ash (Adebowale, 1987). In Nigeria, protein consumption is below 67g recommended by the World Health Organization (WHO) (Akintola *et al.,* 1999). There is therefore, the need to increase the protein intake to a level which compares to that of the developed nations (Okereke *et al.,* 2005), sheep population in Nigeria which is estimated to be 33.9million (FAO, 2008) and which are primarily kept for meat production can bridge the supply-demand of animal protein gap in Nigeria. However, effective and efficient sheep production cannot be enhanced with the use of conventional feedstuffs such as maize, soybean cake and fish meal as supplements to low quality feeds due to their exorbitant cost, erratic supply (Akinmutimi, 2004) and the competition with humans and monogastric animals (Ajayi *et al.,* 2008; Ukpabi and Abdu, 2009). It is in this light that non conventional energy and protein materials of farm and agro-industrial wastes were being exploited for livestock production in Nigeria (Ndubueze *et al.,* 2006; Okonwo *et al.,* 2008). Such feed resources should be cheap, have high nutritive value, non-toxic, readily available, have low or no demand by both humans and other livestock species and without industrial usage (Egbo *et al.,* 2001; Amaefelu , 2002; Ndubueze *et al.,* 2006).

MATERIALS AND METHODS

LOCATION OF THE EXPERIMENTAL SITE

The experiment was carried out at the Ruminant Animal Research Farm of Animal Production Department, Faculty of Agriculture and Agricultural Technology, Abubakar Tafawa Balewa University, Bauchi.

Experimental animals and their management

Twenty Yankasa rams with average weights 15 kg of ranged 14-16 kg and aged 8 – 10 months were used for the experiment. The rams were sourced from Durun and Mararaban Liman Katagum Markets in Bauchi Local Government area of Bauchi state. The animals were housed in individual pens. The houses are with corrugated iron roof and a concrete floor with large windows to enhance ventilation. The Saw dusts/wood shavings were used as bedding materials to protect the animals from dampness and cold. Before the beginning of the experiment, the animals were treated against ector and endo parasites using ivormectin injection and albendazole bolus and also injected intra-muscularly with *oxytetracycline* long acting broad spectrum antibiotic as a precautionary measure against bacterial infections. The animals were allotted to four dietary treatments of five animals each. Each individual animal was kept separately in its on pen. The animals were kept for a period of two weeks to enable them adapt to confinement. During the adaptation period, the experimental diets were offered to the animals at adlibitum. Feed offered and feed refused were recorded for each animals in each group daily while animal weights were taken on a weekly basis, using a hanging scale/spring balance. Average daily feed intake and average daily weight gains were recorded over the 9 weeks experimental period. The diets use as follows: Treatment one (T1) untreated milled sorghum Stover (UMSS) supplemented with 300g cotton seed cake alone, treatment 2 untreated milled sorghum stover (UMSS) with 300g cotton seed cake and maize bran (50:50). Treatment 3 urea treated milled sorghum stover supplemented with cotton seed cake alone,

while those on treatment 4 were fed urea treated milled sorghum stover supplemented with cotton seed cake and maize bran 50:50. All supplements were fed at 300g per head per day. The supplements were fed twice a day, half of each time; in the morning (09:00 hrs.) and evening (16:00 hrs.)

UREA TREATMENT OF SORGHUM STOVER

One thousand kilogram of milled sorghum Stover was treated with 5% urea solution in batches. Five (5) kilograms of urea was dissolved in 100 litres of water was sprinkled to 100 kg of milled sorghum Stover. The milled sorghum stover was mixed thoroughly and compressed before inserted into an air tight polyethene bag. The sample was done in a polyethene bags of dimension 112 cm by 76 cm and ensiled for three weeks. After this period, the ensiled material was opened and air dried under shade for 3 days. Continuous raking was carried out for uniform drying and to minimize the risk of mould.

EXPERIMENTAL DESIGN

The experimental design was completely randomized design with four treatments of five animals per treatment.

CHEMICAL ANALYSIS

All the diets and faeces were analyzed for chemical composition. Each sample was milled to pass through a 1.0mm screen using a telator cyclotee 1093. The milled samples were used for proximate analysis to determine Nitrogen (N) for use in crude protein determination (N x 6.25), crude fibre (CF), ether extract (EE) and ash according to AOAC (1999). Neutral Detergent fibre (NDF) and acid detergent fibre (ADF) were determined according to procedures outlined by Van Soest *et al.* (1991).

DATA ANALYSIS

Data were analyzed using statistical package for social sciences (SPSS) where there is significant difference in analysis of variance (ANOVA) means were separated using least significant difference (LSD) (version: 21, 2006).

RESULTS AND DISCUSSION

Presented in Table 1 is the chemical composition of the experimental diet, the increase in the Crude Protein (CP) content of sorghum stover is in agreement with findings of Yulistiani *et al.*(2003) which found an increase in CP content of urea treated rice straw to be 2.7 times CP and also slightly higher compared to previous experiment reported by Prasad *et al.* (1998) were 2.34 was recorded for urea treated straw kept in bale and 2.433 kept in stack. However, the increase in nitrogen content in the experiment currently reported was higher compared to the result reported by Ahmed *et al.* (2002). This difference could be due to method of ensiling, the variety of the straws, urea treatment level as well as the nitrogen content of the straw. Yulistiani*et al.* (2000) reported that rice straw with low nitrogen content could benefit more from urea treatment to improve nutritive value especially nitrogen content. Urea treatment decreased slightly cell wall component previous study reported by Yulistiani *et al.* (2000) show that effect of urea treatment on cell wall component was not consistent. Daily feed intake of the urea treated sorghum stover was similar across the treatment which is not in agreement with some findings; Ngele *et al.* (2009) and Getahun (2014). This may be attributed to treatment rendered to the basal diet which reduced the particle size of the straw thereby given a better chance for the animals to consume relatively the same amount across the treatments. The average daily weight gain was significantly ($P < 0.05$) affected by the

treatment. The ADG recorded in this study was higher in treatment 3 (78.93 g/day) while treatment 2 with the lowest (57.46 g/day) were lower to those reported (61.70-82.54 g/day) by Aime *et al.* (1999) when determined the effect of urea treatment on digestibility and utilization of sorghum stover.

Conclusion

Based on the results obtained in this study, urea treatment increased the crude protein content of sorghum stover and decreased the acid detergent fibre. It can be concluded that treated sorghum stover with cotton seed cake supplement fed to Yankasa rams gave a better result comparable to those fed untreated sorghum stover with supplements in terms of digestibility and ADG.

Table 1: Chemical composition of untreated and urea treated sorghum stover and supplements.

Parameters (%)	TSS	USS	CSC	MB + CSC
Dry matter	88.23	90.20	93.6	91.27
Organic matter	79.60	83.53	87.8	84.22
Crude protein	18.63	5.83	30.39	25.59
Neutral detergent fibre	43.24	49.39	48.59	48.76
Acid detergent fibre	34.73	42.21	39.17	37.53
Hemicelluloses	8.51	7.18	9.42	11.23
Ether extract	0.72	0.83	6.20	2.32
Ash	8.53	6.61	5.8	7.05

TSS = Treated Sorghum Stover, USS = Untreated Sorghum Stover, CSC = Cotton Seed Cake, MB + CSC Maize Brand and Cotton Seed Cake.

Table 2: Nutrient intake of Yankasa Rams fed untreated and urea treated sorghum stover with supplements

	Treatments					
Parameters	T1	T2	T3	T4	SEM	LS
Average daily supplement intake (g)	300	300	300	300	0.00	NS
Average daily basal feed intake (g)	327.38	314.83	314.58	271.82	12.05	NS
Average daily feed intake (g)	627.38	614.83	614.58	571.82	12.05	NS
Dry matter intake (g/day)	576.10^{a}	557.79^{b}	558.35^{b}	513.64^{c}	5.28	*
Organic Matter Intake (g/day).	566.86^{a}	515.63^{b}	543.81^{c}	469.03^{d}	8.36	*
Crude Protein Intake (g/day)	110.26^{c}	95.12^{d}	149.78^{a}	127.41^{b}	4.66	*
Neutral Detergent Intake (g/day)	307.46^{a}	301.77^{b}	281.79^{c}	263.81^{d}	3.96	*
Acid Detergent Intake (g/day)	255.70^{a}	245.48^{b}	226.76^{c}	206.99^{d}	4.27	*

T1- untreated sorghum stover + cotton seed cake alone, T2- untreated sorghum stover + cotton seed cake and maize brand (50:50), T3-urea treated sorghum stover + cotton seed cake alone, T4-urea treated sorghum stover + cotton seed cake and maize brand (50:50), NDF- Neutral detergent fibre intake, ADFI- Acid detergent fibre intake, * = Significant difference ($P<0.05$), NS = No Significant difference, SEM = Standard Error Mean, LS = Level of Significance. ^{a,b,c} means with different superscript along the same row are significantly different.

Table 3: Growth Performance of animals fed the experimental diets

	Treatments					
Parameters	T1	T2	T3	T4	SEM	LS
Initial weight (kg)	15.40	14.50	15.40	15.00	0.19	NS
Final weight (kg)	19.52^{c}	18.12^{d}	20.37^{a}	19.75^{b}	0.19	*
Total weight gain (kg)	4.12^{c}	3.62^{d}	4.97^{a}	4.75^{b}	0.12	*
Daily weight gain (g)	65.39^{c}	57.46^{d}	78.89^{a}	75.39^{b}	1.93	*
Dry matter intake (g/day)	576.10^{a}	557.79^{b}	558.35^{b}	513.64^{c}	5.28	*
Feed conversion ratio (FCR)	8.81^{c}	9.71^{d}	7.08^{b}	6.81^{a}	0.27	*

T1- untreated sorghum stover + cotton seed cake alone, T2- untreated sorghum stover + cotton seed cake and maize brand (50:50), T3-urea treated sorghum stover + cotton seed cake alone, T4-urea treated sorghum stover + cotton seed cake and maize brand (50:50), ADG= Average daily gain FCR=Feed conversion ratio, DMI= Dry matter intake,* = Significant difference ($P<0.05$), NS = No Significant difference, SEM = Standard Error Mean, LS = Level of Significance. ^{a,b,c} means with different superscript along the same row are significantly different.

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