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GROWTH PERFORMANCE OF YANKASA SHEEP FED VARYING LEVELS OF MOLASSES-UREA TREATED CATTAIL (*Typha domingensis*) SILAGE

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Abstract

The experiment investigated the growth performance of Yankasa sheep fed varying levels of molasses-urea treated Typha Silage. A total of sixty four (64) Yankasa sheep with average initial body weight of 19 ± 1 kg were allotted to four dietary treatments in a completely randomized design with four replicates and four sheep per treatment. Boot stage Typha were harvested from Hadejia Valley Irrigation Project area, Jigawa, chopped to 2 - 3 cm long, compressed in polythene bags after addition of molasses (4.5%) and urea (2.5%), packed and fermented for 60 days. Four experimental diets were formulated; T₁ as control (0% Typha silage), T₂ (10% Typha Silage), T₃ (20% Typha Silage) and T₄ (30% Typha silage). The experimental diets were fed twice daily at 3% DM of their body weight. Chemical composition of experimental diets, voluntary feed intake, live weight changes and feed conversion efficiency were determined. Increasing levels of Typha silage significantly ($P < 0.05$) increased the crude protein and ash content of the experimental diets. The voluntary feed intake was significantly influenced ($P < 0.05$) by increasing level of Typha silage. Weight gains were significantly ($P < 0.05$) increased. Average daily weight gain (ADWG) was significantly ($P < 0.05$) higher in T₂ (106.4 g/day). Final body weight was significantly ($P < 0.05$) influenced. It was recommended that Typha silage could be included at 20% of total mixed ration of sheep diets to improve the growth performance especially during the dry season.

Keyword: *Typha, molasses, urea, weight gain, feed intake*

INTRODUCTION

The shortage of feed in terms of quality and quantity especially during dry season is one of the most serious problems faced by farmers. To overcome feed shortage during dry season, by-product from agriculture and other industries are usually fed to sheep in the form of roughages or concentrates. Use of preserved surplus of various kinds of raw materials such as fresh grasses, leaves and crop residues are fed to sheep in dry season and these could include grasses such as Typha (Hassan et al., 2018). There are very little information about the nutritive value and use of ensiled Typha or Typha with supplementation in feeding ruminants worldwide (Wing-Ching, 2018). Hubbard *et al.* (1988) reported that nutritive value of young Typha before flowering was greater than that of the Typha plant after flowering. Typha silage could replace up to 50% of the daily diet of cattle with other more conventional ingredients (Wing-Ching, 2018). There is paucity of information on the use of Typha silage for feeding ruminants in Nigeria. Therefore, the experiment evaluated the growth performance of Yankasa sheep fed increasing levels of Typha silage as a replacement for sorghum straw in their diet.

MATERIALS AND METHODS

Study Area

The experiment was conducted at the Ruminant Unit of the Teaching and Research Farm of the Department of Animal Science, Federal University, Gashua, Yobe State, Nigeria.



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Experimental Design

Completely Randomized Design (CRD) was used. Growing Yankasa sheep were randomly assigned to four dietary treatments (T₁, T₂, T₃, and T₄) with four sheep per treatment replicated four times. Each replicate consisted of four (4) sheep.

Experimental Diets, Experimental Animals and Their Management

A total of Sixty four (64) growing Yankasa sheep of approximately twelve months (12) months, with average initial weight of 19 ± 1 kg purchased from Gashua livestock market in Yobe were used for the feeding trial. The animals were kept for two weeks adaptation during which they were given Ivermectin (0.2ml/10 kg body weight of the sheep) against endo-and ectoparasites. Tetranor (Oxytetracycline) Dihydrate injection solution were given at (1.0ml/10kg body weight) against bacterial diseases (Benjamin, 1985). Clean drinking water was provided to the sheep ad-libitum. The initial weights of each sheep were taken immediately before the commencement of the experiment. The animals were fed twice daily by 7.00 am and 4.00 pm based on 3% DM of their body weight. Feed leftover of the previous day were weighed and discarded before feeding fresh ones the following morning. The feeding trial lasted for fifty six (56) days.

Table 1: Gross composition of Experimental diets in g/kg

Ingredients (%)	Treatments			
	T1	T2	T3	T4
Typha grass	0	100	200	300
Sorghum Straw	400	300	200	100
Cotton Seed Cake	340	340	340	340
Wheat bran	80	80	80	80
Cowpea husk	150	150	150	150
Bone meal	7.5	7.5	7.5	7.5
Ruminant Premix	2.5	2.5	2.5	2.5
Salt	20	20	20	20
Total(g)	1000	1000	1000	1000
<u>Calculated Analysis</u>				
Crude Protein	14.19	14.45	14.13	14.87
MJ/kg DM	11.27	11.44	11.58	11.60

Data Collection

Feed intake and live weight changes

Feed intake was measured on weekly basis; the feed was measured using weighing scale in kilogram (kg). Feed intake was obtained by weighing the feed offered minus the left over every morning. Initial weight of each growing Yankasa sheep were measured and similar average body weights across the pens was ensured before the commencement of the experiment. Weekly feed intakes were measured while weight gains were taken every two weeks. Top standing digital weighing scale was used to measure the weight of the sheep. The experiment lasted for fifty six (56) days.

Chemical analysis

Samples of Typha silage, feed ingredients and experimental diets were taken to Animal Science department, Ahmadu Bello University, Zaria laboratory for chemical analysis using the standard methods of the Association of Official Analytical Chemists (2006). Fibre fractions were determined as described Van Soest and Robertson (1994).

Statistical Analysis

Data generated were subjected to analysis of variance (ANOVA) using the general linear model (GLM) of the Statistical Analysis System (SAS, 2004). Significant differences between means at 0.05% level of probability were separated using (LSD) least significant difference.

RESULTS AND DISCUSSION



The tables below indicated the results of the experimental diets used in the study. The dry matter were significantly ($P<0.05$) different among the treatments. There was significant ($P<0.05$) difference in the CP among all the treatments. There was significant ($P<0.05$) difference in the crude fibre among all treatments. There was significant ($P<0.05$) difference in the ether extract among all the treatments. There was no significant ($P<0.05$) differences in the ash contents among all treatments. There was significantly ($P<0.05$) differences in the ADF and NDF among all the treatments. There was no significant ($P<0.05$) differences in the hemicellulose contents among all the treatments. There was significant ($P<0.05$) difference in the cellulose content among all the treatments. There were significant ($P<0.05\%$) differences in the weight gain with T2 (4.47 Kg) having the highest value among all the treatments. The daily weight gain were significantly ($P<0.05$) different for the sheep fed increasing levels of molasses-urea treated Typha silage. Voluntary feed intake and feed conversion ratio (FCR) were significantly ($P<0.05\%$) different. Results of proximate compositions showed that crude protein values (14.04 to 17.49%) of the experimental diets were within the values of 15 – 18% recommended by ARC (1990) for growing sheep with the exception of T₁ (14.04%). The NDF of the experimental diet values (46.37 – 48.68%) were lower than NDF (60.0%) of 45% ensiled water hyacinth. Similarly, the ADF values (27.54 – 30.32%) were also lower than ADF of (35.0%) when fed 45% ensiled water hyacinth in the diet in growing sheep reported by (Ho, 2015). Results of this experiment indicated a decrease in the feed intake with increasing levels of Typha silage. The decrease ($P>0.05$) is due to the fact that Typha silage has more energy than sorghum straw which is a roughage of low quality and the animal tend to eat more in order to satisfy their needs for energy and other nutrients (McDonald *et al.*, 1995). This experiment also indicated that final body weight obtained for animals on 20% Typha silage (24.46 kg) was similar to the findings of Malisetty (2013) who reported 24.45 kg as the final body weight () of growing Nellore sheep fed maize silage and Lucerna hay after 90 days. The average daily weight gain in the study was (78.81 – 106.47 g) similar to the weight gain of Maigandi *et al.* (2002) that reported an ADG of between 68 and 93 g when they replaced cowpea husk with fore stomach digesta (FSD) in the diet of growing sheep. However, the ADG was higher than the findings of Adu (1985) that reported an ADG of 65 g when the author replaced maize with brewer's dried grains in the diet of growing sheep, which is less than the ADG obtained from animals on 20% Typha silage diet (106.42 g). The ADG were within the findings of Adu and Brinkman (1981) that reported ADG value of (78 - 183g/day) when fatten sheep were fed varying levels of guinea corn and *Digitaria smutsii* hay as source of roughage.

CONCLUSION

Voluntary feed intake, live weight changes and feed conversion efficiency were influenced by increasing levels of molasses-urea treated Typha silage in the diet of growing Yankasa sheep. Typha silage treated with molasses and urea had positive effects on the nutritional compositions of the experimental diets. This study indicated that Typha silage could be incorporated into the diet growing Yankasa sheep up to 20% level to improve their growth performance.

Table 2: Chemical compositions of experimental diets

Parameters %	Treatments				SEM	P
	T1	T2	T3	T4		
Dry matter	92.42 ^a	81.47 ^{bc}	81.61 ^{bc}	78.70 ^d	3.76	**
Crude protein	14.04 ^d	17.49 ^{ab}	17.41 ^{ab}	15.82 ^c	0.91	**
Crude fibre	27.87 ^{ab}	26.69 ^c	25.78 ^d	27.61 ^{ab}	0.54	**
Ether extract	1.16 ^b	1.26 ^a	1.14 ^{cd}	1.13 ^{cd}	0.01	**
Ash	9.58 ^a	8.65 ^{cd}	8.81 ^b	8.67 ^{cd}	0.10	**
ADF	30.32 ^a	29.37 ^b	27.71 ^{cd}	27.54 ^{cd}	0.68	**
NDF	60.46 ^a	52.01 ^d	57.63 ^{bc}	58.67 ^{bc}	2.01	**
Lignin	9.22 ^d	18.61 ^a	14.6 ^{bc}	13.80 ^{bc}	1.48	**
Hemicellulose	51.99 ^a	50.42 ^c	51.06 ^b	49.19 ^d	0.12	**
Cellulose	30.12	29.68	29.87	29.23	1.75	NS

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abcd: means separated by different superscripts are significantly ($p < 0.05$) different. SEM= Standard error of mean. T1; Control, T2; 10% Typha silage, T3; 20% Typha silage, T4; 30% Typha silage.

Table 3: Growth performance of Yankasa sheep fed control diet and molasses-urea treated Typha silage in their diet

Parameters	Treatments				SEM	P
	T1	T2	T3	T4		
Initial Body weight (kg)	19.96	19.99	19.42	20.47	0.71	NS
Final Body weight (kg)	24.04 ^{bc}	24.46 ^a	24.09 ^{bc}	23.78 ^d	0.04	**
Weight gain (kg)	4.08 ^c	4.47 ^{ab}	4.46 ^{ab}	3.31 ^d	0.03	**
Av daily gain (g)	97.14 ^c	106.2 ^{ab}	106.42 ^{ab}	78.81 ^d	3.04	**
Feed intake DM (kg/day)	1.00	0.98	0.96	0.94	0.82	NS
Feed Conversion Efficiency	10.29 ^b	9.21 ^{cd}	9.10 ^{cd}	11.93 ^a	0.01	**

abcd: means separated by different superscripts are significantly ($p < 0.05$) different. SEM= Standard error of mean. T1; Control, T2; 10% Typha silage, T3; 20% Typha silage, T4; 30% Typha silage.

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