Yeast (*Saccharomyces cerevisiae)* treated groundnut haulms and dry cassava peels-based diets improved weight gain and economics of goat kids

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ABSTRACT

The study investigated the feed intake and economics of growing Red Sokoto goat kids fed *Saccharomyces cerevisiae*-treated biodegraded groundnut haulms (SCGH) and dried Cassava peels (DCP). The diets consisted of (T1; 0% SCGH: DCP) and dried cassava peels in combination with *Saccharomyces cerevisiae*-treated biodegraded groundnut haulm at different proportions of 275:695 (T2), 375:595 (T3), and 475:495 (T4) g/kg dry matter (DM), respectively. Twelve healthy Red Sokoto goat kids (RSGKs) weighing 9.5 ± 0.40 kg BW and aged 7 to 8 months were randomly allocated to four dietary treatments with three replicates per treatment in a completely randomized design. Animals were housed individually in a well-ventilated open-sided small ruminant pen (1.2 m × 0.9 m) and fed (5% of their BW) which is 900 g of the total mixed ration. The experiment lasted for 90 days. There was no significant (P>0.05) difference between the average daily gain of T1: control (58.20 g/d) and goat kids fed T4 (58.89 g/d). However, feed conversion ratio and feed cost saving (₦630.80) increased with the inclusion of dried cassava peels and treated-groundnut haulms in the diets. It was concluded that growing goats can be fed yeast treated groundnut haulms-cassava peel-based diet without affecting feed intake and at the same time minimizing cost of feeding.

Keywords: Goat, chemical composition, Yeast, Ruminant, Feed intake, Dietary treatment

INTRODUCTION

Cassava peels form the bulk of residues from cassava root after post-harvest and processing (Abatan et. al., 2015). Ruminants can be fed the stem, leaves, peel and other by - products of the tuber (Fajemisin et al., 2012). Jakonda (1975) suggested that cassava or its peels can be used in feeding various classes of livestock as a way of increasing animal protein supply. Other parts of cassava plant already being evaluated for livestock feeding include the leaves and tender sterns (Akinfala and Tewe, 2004).

The use of probiotics (bacteria and fungi) in ruminant as a dietary supplement has been found to improve feed intake, growth performance, digestibility and microbial activities in the rumen (Fajemisin *et. al*., 2018). Hence, it was conceived that dry cassava peels in combination with yeast-treated groundnut haulms could be utilize as dry season feedstuffs for goats. Therefore, this study investigated the effect graded levels of dry cassava peels and *Saccharomyces cerevisiae* treated groundnut haulms on growth performance and economics of growing Red Sokoto goat kids.

MATERIALS AND METHODS

The research was carried out at the Ruminant Unit of the Teaching and Research Farm of the university. Dry groundnut haulms were purchased from neighboring livestock market. Thereafter, 5 gram and 50 gram of yeast (*Saccharomyces cerevisiae*) and molasses respectively were dissolved in 1 litre of water solution and added to 1 kg of GNH and mixed thoroughly according to the procedures of (Musa et al., 2020). Four experimental diets were formulated and designated as T_1, T_2, T_3, and T_4 respectively. The four dietary treatments formulated were control diet (T1) and *Saccharomyces cerevisiae*-treated biodegraded groundnut haulm at different proportions of 275:695 (T2), 375:595 (T3), and 475:495 (T4) g/kg dry matter (DM), respectively. The gross composition of the experimental diets for the experimental diets is shown in the Table 1.

Twelve healthy Red Sokoto Goat kids weighing 9.5 ± 0.40 kg BW were purchased from Gashua livestock market and used for the experiment. After veterinary inspection, the animals were randomly distributed into four dietary treatments with three replicates per treatment following a completely randomized design. Each goat kids formed an experimental unit. The feed refusals were removed daily before fresh feeds were provided again. Dry matter, nutrient intakes and feed conversion ratio were determined. The experiment lasted 90 days after a preliminary adaptation period of two week. Samples of dried cassava peels, yeast-treated groundnut haulms and the four formulated experimental diets were dried individually in an air-draft oven at 60 °C for 96 h, ground separately to

Table 1: Gross Composition of Experimental Diets (g/kg DM)

Ingredients	T1	T2	T3	T4
Dried Cassava Peels	0	275	375	475
Yeast-treated Groundnut haulms	0	695	595	495
Wheat offal	200	0	0	0
Rice Husk	200	0	0	0
Palm kernel cake	370	0	0	0
Balanite eagyptiaca Leaf meal	200	0	0	0
Sulphur	10	10	10	10
Bone meal	10	10	10	10
Salt	5	5	5	5
Ruminant Premix	5	5	5	5
TOTAL	1000g	1000g	1000g	1000g
Calculated Analysis				
Crude Protein (%)	13.02	13.51	13.40	13.39
GE (KJ/100g DM)	8.40	8.51	8.62	8.57

GE: Gross Energy

pass through a 1 mm sieve in a Wiley mill. Samples were then taken to the laboratory for chemical analysis using the standard methods of the Association of Official Analytical Chemists (AOAC, 2006). Fiber fractions which are neutral detergent fiber (NDF), acid detergent fiber (ADF), and acid detergent lignin (ADL) were done using the ANKOM fiber analyzer as described by Van Soest et al. (1991).

Data were subjected to analysis of variance (ANOVA) for a completely randomized design, with a model that included the diet as treatment effect, using Statistical Analysis Software (SAS, 2015). Means were separated using Least Significant Difference (LSD) at the level of $P \leq 0.05$.

RESULTS AND DISCUSSION

The growth performance of Red Sokoto Bucks fed cassava peels and yeast-treated groundnut haulms at graded levels in their diets is shown in table 2. The average final weight (AFW) was significantly (P<0.05) different across the treatments. Higher AFW were recorded in the T1; control and T4 (CSP 475g: GH 495g). T1 recorded the lowest AFW (13.17kg). Similarly, the weight gained were higher in T1 and T4 with the values (5.24kg and 5.30kg) respectively. Average daily weight gain (g/d) was significantly (P<0.05) different among T1, T2 and T3 but there is no significant different between the control (58.20 g/d) and goat fed T4 (58.89 g/d) diets. Better FCR was obtained in goats fed control diets (8.84) and treatment 4 (9.61). The economics of production using *Saccharomyces cerevisiae*-treated groundnut haulms and dried Cassava Peels diets to feed RSBs is shown in table 3. Treatment 3 had the highest Kg feed consumed per Kg gain. Average weight gained (kg) was higher in the control diet and T4 while lower Average weight gain (kg) was recorded in T2. Feed cost/Kg gain (₦) was significantly higher (P<0.05) in T1: control and decrease progressively in T2, T3 and T4 as dried cassava peels increases. Feed cost Saving (₦) was higher in T4 (₦630.80) In this study cassava peels used were sundried and Sulphur was also included in the diets to reduces the HCN content of the peels and this was corroborated by

Table 2: Growth Performance of Red Sokoto goat kids fed Control diet and mixture of *Saccharomyces cerevisiae*-treated Groundnut haulms and dried Cassava Peel based-diets.

Parameters	Diets					
	T1	T2	T3	T4	SEM	P-Value
Initial weight (kg)	9.83	9.10	9.60	9.40		0.08^{NS}
Average Final weight (kg)	15.07^{ab}	13.17^{d}	14.10^{c}	14.70^{ab}	0.66	0.01*
Average Weight gain (kg)	5.24^{ab}	4.07^{c}	4.50^{d}	5.30^{ab}	0.21	0.02*
Average Daily Gain (g/d)	58.20^{ab}	46.00^{cd}	50.00^{cd}	58.89^{ab}	4.42	0.02*
Total Feed Intake (kg)	46.31	48.71	50.53	50.91	3.94	0.003^{NS}
Ave. Daily Feed Intake (g/d)	514.55	541.17	561.40	565.70	23.12	0.43^{NS}
Feed Conversion Ratio	8.84^{cd}	11.77^{ab}	11.22^{ab}	9.61^{cd}	1.48	0.02*

^{abc} = means on the same column with different superscripts are significantly varied (P < 0.05). SEM; Standard Error of Mean, T1: control diet, T2: (CSP 275: Groundnut haulms 695g) T3: (CSP375g: Groundnut haulms 595g), T4: (CSP 475g: Groundnut haulms 495g)

Niayale et al., (2020).The AFW, WG and ADG obtained in this study were higher than that reported by (Abatan, *et al*., 2015) when cassava peels and cassava foliage-based diets were fed to WAD goats. Feed cost/Kg gain (₦) was significantly higher (P<0.05) in T1: control and decrease progressively in T2, T3 and T4 as dried cassava peels increases. Feed cost Saving (₦) was higher in T4 (₦630.80) followed by T2 (₦478.70). The least Feed cost Saving (₦) was recorded in T3 (₦428.00). Cost of feed and feed cost saving (₦) obtained in this study were lower than that reported by (Audu et al., 2020).

Table 3: Economic analysis of Red Sokoto goats kids fed Control diet and mixture of *Saccharomyces cerevisiae*-treated Groundnut haulms and dried Cassava Peels diets.

Parameters	Diets			
	T1: CON	T2	T3	T4
Cost of feed (₦/kg)	170.00	110.00	95.70	90.00
Kg feed consumed per Kg Gain	8.84	9.31	11.23	9.61
Ave. Weight gained (kg)	5.24	4.07[c]	4.50	5.30
Feed cost/Kg gain (₦)	1502.80	1024.1	1074.11	864.00
Feed cost Saving (₦)	-	478.70	428.00	630.80

T1: control diet, T2: (CSP 275: Groundnut haulms 695g) T3: (CSP375g: Groundnut haulms 595g), T4: (CSP 475g: Groundnut haulms 495g)

CONCLUSION

The results revealed that increasing levels of cassava peels in the diets of RS goat kids improved the growth performance and reduces the feed cost. The optimum performance was obtained in goats fed T4: (SCGH: 475 g - CSP: 495 g). This implies that dry cassava peels and biodegraded groundnut haulms can serve as alternative when forage are of low availability and conventional feeds are high in price.

ACKNOWLEDGEMENTS:

The authors expressed appreciation for grant received from TETFUND under the Institution Based Research Grant and the Federal University, Gashua's research committee and the management for the approval.

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