

UTILIZATION OF ACHA HAY (*GIGISTARIA EXILIS*) WITH LABLAB HAY (*LABLAB PURPUREUS*) AS SUPPLEMENT FOR YANKASA RAMS IN ADAMAWA STATE, NIGERIA

T. F. MBAHI AND D. Y. GOSKA

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ABSTRACT

The study was conducted to evaluate the feeding value of acha hay and lablab hay based diets to Yankasa rams. Twenty Yankasa rams aged between 6 to 9 months with average live-weight of 10 to 12kg were subjected to five treatment diets each consisting of four replicates in complete randomized design (CRD). The five treatment diets are T1 (Sole acha hay), T2 (Acha hay +100g lablab hay), T3 (Acha hay +200g lablab hay), T4 (Acha hay +300g lablab hay) and T5 (Acha hay +400g lablab hay). Feed intake was significantly different ($P<0.05$) with the highest intake recorded in T5 and least in T1. Feed conversion ratio was also significantly different ($P<0.05$), but live-weight gain was not significantly different ($P>0.05$), although it increases with supplementation level. Nutrients digestibility was not significantly different ($P>0.05$) but improves with level of supplement. The Acha hay and lablab hay being available during period of scarcity could improve the performances of the animals.

KEYWORDS: Acha hay, Lablab hay, Digestibility, Performance, Yankasa rams.

INTRODUCTION

Small ruminants especially sheep and goats in the humid tropical regions of Africa roam around and eat natural pastures and kitchen wastes which contain low crude protein, high fibre and lignin (Tchinda *et al.*, 1993 and Aregheore, 2000). The low nutritional plane greatly hampers the productivity of these animals especially during the dry season when the crude protein content of these feedstuffs could be as low as 2% (Sarwatt *et al.*, 2004). This situation has resulted to slow growth rate, loss of body weight, low birth weight and increased susceptibility to disease attack and death. A balance of energy and protein with essential nutrients is required to alleviate or improve the productivity of these small ruminants (Mendietta-Araica *et al.*, 2011).

Cereal crop residues which are the only alternative source of feed during the dry season are very low in nitrogen and high in lignocellulosic compound content of over 35% which is low in fermentable energy but high potassium and available vitamins with low phosphorus (Ehoche, 2002). The situation has led to decreased voluntary feed intake and digestibility (Adebola, 2002).

Acha is one of the most important grain crops produced in Northern Nigeria in abundance during the dry season especially in Plateau State. It is harvested after grain maturity to be used as food by man, while the straw is left wasted on the farms which could be used as livestock feed although it has high fibre which will require supplementation as way of improving the utilization and productivity of ruminant livestock (Aregheore *et al.*, 2004).

The supplementation of untreated stover or grass hay with leguminous forages has beneficial effects to ruminant animals as it increases metabolizable energy and nitrogen intake, improve palatability, increased available minerals and vitamins, better rumen function and laxative influence on the alimentary system (Ojo *et al.*, 2001).

Therefore, this study is meant to measure the response of yankasa rams fed acha hay with lablab hay as supplement in Adamawa, Nigeria.

MATERIALS AND METHODS

Site of Study

The study was conducted at the Small Unit of Teaching and Research Farm of the Department of Animal Science and Range Management, Modibbo Adama University of Technology, Yola, Adamawa State. Yola is located in the North Eastern part of Nigeria. It is situated within the Savannah region and lies between latitude 7° and 11° North and longitude 11° and 14° East and altitude of about 185.9m above sea level. Yola has a tropical climate marked by rainy and dry seasons. Maximum temperature can reach 40°C particularly in April, while minimum temperature can be as low as 18°C with annual rainfall of less than 1000mm (Adebayo and Tukur, 1999).

Experimental Animals and Management

Twenty Yankasa rams aged between 6 to 11 months with an average weight of 10 to 12kg were purchased at Ngurore sheep and goats market of Adamawa State. They were adapted for a period of

T. F. Mbahi, Department of Animal Science and Range Management, Modibbo Adama University of Technology, Yola, Nigeria.

D. Y. Goska, National Animal Production Research Institute, Ahmadu Bello University, Zaria, Nigeria.

fourteen days. Thereafter, they were dewormed with Albendazole and dipped in acaricides solution against ecto-parasites.

Experimental Diets and Design

Acha hay was fed *ad libitum* as basal diet and lablab hay as supplement with five treatments. The twenty yankasa rams were allotted to the five treatment diets and replicated four times in complete randomised design (CRD). The treatment combinations are shown below:

- Treatment 1: (Sole acha hay)
- Treatment 2: (Acha hay +100g lablab hay)
- Treatment 3: (Acha hay +200g lablab hay)
- Treatment 4: (Acha hay +300g lablab hay)
- Treatment 5: (Acha hay +400g lablab hay).

DATA COLLECTION

Feeding Trial

Feeds were offered twice daily in the morning and evening (8.00am and 4.00pm), while salt lick and water were provided *ad libitum*. The left over of feed were weighed every morning before the next feeding. The growth performance of the rams was determined by weighing them with scale on weekly basis.

Digestibility Study

The digestibility study was conducted immediately after feeding trial. Fifteen Yankasa rams were selected from all the treatments and taken to the metabolic crates for the digestibility study. They were

allocated to the same treatment diets used in the feeding trial and adapted for seven days before the collection of the faeces. The collection lasted for five days. Feed offered and refusals were weighed daily. Total faecal output was measured daily using a weighing scale and 10% sub-sample were dried and stored for dry matter determination before chemical analysis.

Chemical Analysis

Proximate analysis of the feeds and faecal samples were determined by the standard method according to A.O.A.C (2004). Acid detergent fibre and Neutral detergent fibre according to Goering and Van Soest (1990).

Statistical Analysis

Data collected from the study were subjected to analysis of variance (ANOVA) of a CRD design and least significant difference (F-LSD) test was used to separate significantly different treatment means (Steel and Torries, 1980).

RESULTS

Chemical Composition

Table 1 shows the chemical composition of the experimental diets fed to Yankasa rams. The acha hay contains 93.45%DM, 5.56%CP, 0.56%EE, 6.50%Ash, 56.81%NFE, 50.40%ADF and 60.10%NDF, while the lablab hay contains 95.00%DM, 11.50%CP, 1.89%EE, 9.42%Ash, 42.39%NFE, 31.56%ADF and 51.48%NDF respectively.

Table 1: Chemical Composition of the Experimental Diets (%DM).

Constituents %	Acha hay	Lablab hay
Dry Matter (DM)	93.45	95.00
Crude Protein (CP)	5.56	11.50
Ether Extract (EE)	0.56	1.89
Ash	6.50	9.42
Nitrogen Free Extract	56.81	42.39
Acid detergent fibre (ADF)	50.40	31.56
Neutral detergent fibre (NDF)	60.10	51.48

The performance characteristics of yankasa rams fed acha hay and lablab hay are shown in Table 2. The Yankasa rams placed on all the dietary treatments 1 to 5 ranged from 20.54 to 30.82kg. There was significant difference ($P<0.05$) in feed intake of Yankasa rams. The highest value of 30.82kg was obtained among rams fed Acha hay with 400g lablab hay, while the least intake of 20.54kg was recorded among rams fed acha hay only (T1). The feed conversion ratio was significantly different

($P<0.05$) across the treatment groups which improves with the level of supplementation. Weight gain was not significant ($P>0.05$) showing that the treatment diets showed no influence, but numerically the highest value of 3.83Kg was obtained among the group fed acha hay with 400g lablab hay (T5) and the least value of 2.77Kg was recorded among yankasa rams fed acha hay alone (T1).

Table 2: Performance of Yankasa Rams Fed Acha Hay as Basal Diet Supplemented with Lablab Hay.

	T1	T2	T3	T4	T5	LSD
Total feed intake (Kg)	20.54	26.59	30.46	26.55	30.82	3.21*
Average feed intake (g/h/d)	228.25	295.50	338.50	295.00	342.50	18.15*
Feed conversion ratio	7.41	9.26	9.14	9.83	8.04	1.01*
Initial live-weight (kg)	10.48	10.80	11.70	10.98	11.50	1.70 ^{ns}
Final live-weight (kg)	13.25	13.67	15.03	13.68	15.33	36.8 ^{ns}
Weight gain (kg)	2.77	2.87	3.33	2.78	3.83	1.30 ^{ns}
Average daily weight gain (g/h/d)	30.77	31.88	37.00	30.00	42.55	2.10 ^{ns}

The digestibility of nutrients by yankasa rams fed basal diet of acha hay with lablab hay as supplement is presented in Table 3. Significant difference ($P < 0.05$) occur with digestibility of dry matter, while no significant

difference ($P > 0.05$) occur with crude protein, ether extract, acid detergent fibre and neutral detergent fibre across the treatment groups, but numerically increases with the level of supplement inclusion.

Table 3: Nutrient Digestibility of Yankasa Rams Fed Acha Hay as Basal Diet with Lablab Hay as Supplement.

Parameter %	T1	T2	T3	T4	T5	LSD
Dry matter digestibility	61.30	64.33	66.50	66.73	69.87	3.88*
Crude Protein digestibility	67.50	68.10	68.80	68.95	69.00	2.75 ^{ns}
Ether extract digestibility	55.95	65.95	67.00	67.00	67.27	4.05 ^{ns}
Acid detergent fibre digestibility	43.00	44.02	48.27	50.10	52.13	10.36 ^{ns}
Neutral detergent fibre digestibility	69.30	76.60	76.97	77.60	79.11	11.56 ^{ns}

DISCUSSION

The crude protein content of acha hay (5.56%) in this study was similar to 5.36% reported by Orskov *et al.* (1980) but lower than 6.75% reported by Finangwai *et al.* (2012) and 6.28% by Akinfemi (2012) in a similar study with acha straw, while 7.20% was reported by Babayemi *et al.* (2006) in a study with cenhrus ciliaris. Crude protein of lablab (11.50%) was lower than 14.06% reported by Babayemi *et al.* (2006) but similar to 10.50% reported by Mbahi *et al.* (2006). The ether extract content of acha hay (0.56%) was higher than 0.11% reported by Finangwai, 2012, but lower than 2.02% reported by Akinfemi, 2012. Babayemi *et al.* (2006) in a similar study reported a higher value of 3.07% with panicum maximum. The lablab had 1.89% ether extract which is higher than 1.42% reported by Mbahi *et al.* (2006), while Babayemi *et al.* (2006) reported higher value of 2.83%. Ash content of acha hay (6.50%) was similar to 5.96% and 6.30% reported by Akinfemi (2012) and Finangwai *et al.*, 2012, while 6.00% was reported for biscuits wastes in a similar study by Enjoi louna *et al.*, 2011. The ash content of lablab hay was 9.42% which agree with 9.47% reported by Babayemi *et al.* (2006), but lower than 11.97% reported by Mbahi *et al.* (2006). The ADF and NDF in the study were lower than 54.26% and 68.15% reported by Akinfemi *et al.*, 2012 for acha hay, while Babayemi *et al.* (2006) and Sath *et al.* (2012) in a similar study with panicum maximum and rice straw reported 36.95% and 50.3% ADF and 73.39% and 74.5% NDF. The ADF (31.56%) and NDF (51.48%) content of lablab were comparable with ADF (32.57%) and NDF (51.44%) reported by Babayemi *et al.* (2006), while Mbahi *et al.* (2006) reported higher values of ADF (34.38%) and NDF (68.80%) respectively. There was higher feed intake with the diets supplemented with lablab hay than the control diets which could be as the result of the lablab hay inclusion which made the feed more palatable. Similar findings were reported by Umuna *et al.* (1995), Babayemi *et al.* (2006), Adegun and Aye (2013) who stated that supplementation increases intake of animals.

Feleke *et al.* (2011) reported comparable results that intake of DM, OM and CP increased with increasing levels of supplements which could be responsible for the increased intake of the animals in this study. Feed conversion ratio agrees with the earlier reports by Aye (2007) and Yousouf *et al.* (2007) that supplementation improves feed conversion ratio of sheep. The live-weight gain of rams increases with levels of supplement which

is as a result of DM and CP intake and utilization. The live-weight changes in this study agrees with the earlier report by Sukkasem *et al.* (2002) and Babayemi *et al.* (2006), but contrary to the results reported by Ndemaniho *et al.* (2007) that growth rates did not differ with goats fed different sources of supplements. The dry matter digestibility values were fairly high in all the treatments which could be due to the lablab hay inclusion. A similar finding was reported by Mupanga *et al.* (2000), kamaludeen (2013) and Aye (2007) that activity of ruminal microbes is improved by nitrogen supplementation of diets leading to high digestibility.

CONCLUSION

The lablab hay being a legume that has high crude protein content when used as supplement to Acha hay based diet could improve the dry matter intake, nutrients digestibility and weight gain of rams. Acha is a cereal crop that is normally produced during the dry season on irrigation and the lablab is also a drought resistant crop and available at all seasons which could reliably be used as supplement to the low quality grass during the dry season when feed is scarce and of low quality, thereby increasing the productivity of the animals.

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