

Performance of growing Yankasa rams Fed graded levels of Tamarindus indica leaves

***Garba, Y¹ and Jinjiri, A²**

¹Centre for Dryland Agriculture, Bayero University, Kano

²Department of Animal Science, Bayero University, Kano

Correspondence author email: yugarba@yahoo.com, garbay4244@buk.edu.ng
08037391963, 08025092721

Abstract

A feeding trial which lasted eight (8) weeks was carried out to determine the intake and nutrient digestibility by growing Yankasa rams fed graded levels of *Tamarindus indica* leaves. Twelve Yankasa rams with average liveweight of 17.40kg were randomly allocated to three treatments of four replicates in a Randomized Complete Block Design. The experimental diets formulated were A (0%), B (15%) and C (30%) inclusion levels of the test ingredient. The results revealed that animals fed 0% inclusion level (Control diet) had higher DMI, EEI and CFI, which varied significantly ($P<0.05$) between the treatments. The animals fed 30% inclusion level of *T. indica* had significantly ($P<0.05$) higher Crude Protein (105.88g/day) and Nitrogen Free Extract Intake (319.14g/day) compared to other treatments. All the digestibility indices except ash digestibility varied significantly ($P<0.05$) across the treatments. The crude fibre digestibility, ether extract digestibility and dry matter digestibilities were significantly higher ($P<0.05$) in the animals fed 0% inclusion level compared to other treatments. However, crude protein digestibility and nitrogen free extract digestibilities were significantly ($P<0.05$) higher in treatment with 30% inclusion of *T. indica* leaves compared to other treatment means. It is concluded that *T. indica* improves protein content of feed. It is therefore recommended that feeding trials be conducted using *T. indica* leaves to ascertain the nutritive value and its suitability as feedstuff for small ruminants particularly during feed scarcity for improved performance and productivity.

Key words: *Tamarindus indica*, Yankasa, Intake, Digestibility

Introduction

The small ruminant species is made up of the sheep, goat, llama and alpacas. These animals are so described or named as a result of their physiology of feed digestion and comparative small body size compared to buffalo and cattle (Adeloye, 1998). They are found in large numbers in the globe, being adapted to different ecological zones. These animals are useful in developing countries especially in Africa and India, where large proportions of the populations are farmers. The ruminant animals in the

tropics are predominantly raised on grasses which are inherently low in digestibility, nutritive value and unavailable in the offseason (Babayemi *et al.*, 2009).

Low quality of feed is associated with the fibrous and lignified nature of pastures which limits the intake, digestibility and utilization (Olafadehan, *et al.*, 2009). Browsers have been reportedly fed to sheep and goats with improved animal performance as they form a good substitute for grass during prolonged period of drought. One of such browsers is

Tamannus indicu. which has been reported to be used as livestock feed particularly as a milk enhancer in Birnin Gwari Local Government Area of Kaduna State (Yahaya *et al*, 2009). Thus, this study was conducted to determine the feed intake and nutrient digestibility by Yankasa sheep fed *T. indica* at graded levels.

Materials and Methods

Experimental location

The experiment was carried out at the Livestock Teaching and Research Farm, Bayero University, Kano between July-September, 2010. Kano lies on longitude 9°30' and 12°30' North and latitude 9°30 and 8°42' East on an elevation 468m. It has a mean daily temperature range of 30°C to 33°C and annual rainfall ranges between 787 and 960 mm (KNARDA, 2001).

Experimental animals and their management

Twelve Yankasa rams with an average weight of 17.40kg were selected from the livestock farm of the Department of Animal Science and used for the study.

Prior to the commencement of the experiment, the experimental animals were dewormed with Albendazole at 1ml per 50kg body weight and fed with the experimental diets. The experimental animals were allocated to the three treatment groups comprising four animals per treatment.

Feed formulation and experimental design

Three experimental diets were formulated and designated as TA, TB and TC representing 0%, 15%, and 30% inclusion level of *Tamarindus indica* (Table

1). The feed ingredients used were *T. indica*, wheat offal, rice mill waste, cotton seed cake, groundnut hay and cowpea husk. All the feed ingredients were purchased from livestock feed market in Kano with the exception of *T indica* leaves which were collected from around nearby bushes in the study area. A randomized complete block design (RCBD) was used in the experiment.

Data Collection

Feed intake

The animals were housed individually and provided with water *ad libitum*. The experimental diets formulated were given to the animals every morning between 7:00am-7:30am daily throughout the period of the study at the rate of 4% of their body weights.

Liveweight changes

Prior to the commencement of the experiment, the experimental animals were balanced for weight and allocated into three treatment groups. The initial weights were taken and the animals were thereafter weighed weekly in order to find out their liveweight changes, The liveweight changes were determined by difference (final-initial), the daily record of the feed intake was obtained by subtracting the quantity of left over from the feed offered the previous morning.

Digestibility trial

At the end of the feeding trial which lasted eight weeks, digestibility trial was conducted. The animals were harnessed with harness bags for adaptability to the bags. This lasted for 21 days (14 days for adaptation and seven (7) days for the collection of the faecal samples). Faecal output was collected and weighed. 5% of the total output was retained for oven-

drying and dry-matter determination and proximate analysis (AOAC, 1990).

Data Analysis

Data generated were subjected to analysis of variance (ANOVA) using general linear model of SAS (2000). Difference between means were compared at ($P < 0.05$) using fisher's least significance difference (LSD) of the same statistical package.

Results and Discussion

Table 2 presents the proximate composition of the experimental diets. The result showed that the ash content of the experimental diets varied significantly ($P < 0.05$) across the treatments, with 15% inclusion level having the highest ash content (7.46%) followed by 0% inclusion level (6.15%) while 30% inclusion level had the least (5.27%). There was however no significant ($P < 0.05$) differences in other proximate constituents. The crude protein (CP) content, NFE and DM were however higher in 30% inclusion level (15.86%, 47.81% and 93.17%) respectively.

Table 3 gives summary of the performance characteristics of Yankasa rams fed graded levels of *Tamarindus indica* leaves. The body weight changes were, 2.90kg, - 2.00kg and 0.55kg for 0%, 15% and 30% inclusion levels respectively. The result indicated that, there was significant difference ($P < 0.05$) in the final body weight with the 0% inclusion level having the best (20.60kg), followed by 30% inclusion level (17.73kg) while 15% inclusion level (15.38kg) resulted in a weight loss. This weight loss was as a result of ill-health of the experimental animals. The average daily feed intake, crude protein intake, crude fibre intake, ether extract

intake, nitrogen free extract intake and daily dry matter intake varied significantly ($P < 0.05$) across all the treatments. The average daily ash intake not being statistically significant ($P > 0.05$) in the present study is not in agreement with Garba *et al.*; (2010) who reported that ash intake was statistically significant for Yankasa rams fed graded levels of *Guiera senegalensis*. *T. indica* have been reported to contain 0.14 mg/g tannin, 47.57mg/g phenols, 0.52mg/g saponins, 8.28mg/g oxalate, 2.91mg/g alkaloids, 2.63u/g, 0.82u/g fiouroacetate and 0.05mg/g phytates (Garba *et. al.*, 2010a)

Table 4 summarizes results of the digestibility study. All the evaluated digestibility indices, crude protein digestibility (CPD), crude fibre digestibility, nitrogen free extract digestibility (NFED), ether extract digestibility and dry matter digestibility (DMD) were significantly different ($P < 0.05$) with the exception of ash digestibility (AD). The DMD values obtained in the present study was not in agreement with the result obtained by Usman *et al.* (2008) whose value ranged between 61.39% and 84.37% when fore stomach digesta and poultry waste was fed to Uda lambs. The CPD value obtained in this study is in agreement with the report of Fajemisin *et ah* (2008), but not in conformity with the values reported by Maigandi and Wasagu (2002) whose value ranged between 75.5% and 81.06% when *Ficus sycomorus* leaves was fed to Yankasa rams. This could be due to the higher protein content of *T. indica* leaves (Aminu, 2010). The result obtained also contradicts the CPD values reported by Ahamefule *et al.*, (2002) who reported 43.66 to 57.69% when potatoes peels yeast slurry diet was fed to West African Dwarf goats.

The DMD, CPD and BED values obtained in the present study were higher than the report of Lamidi *et al*; (2010) when *Panicum*, *Gmelina*, *Gliricidia* and a mixture of *Gmelina-gliciridia* based diet were fed to West African Dwarf goat.

Conclusion

From the result obtained, it is concluded that animals fed 30% inclusion levels of *Tamarindus indica* leaves compared favourably with animals placed on 0% inclusion level (control diet) in terms of intake and digestibility indices. Therefore it is concluded that, *Tamaridus indica* has

the potential of meeting the nutritional needs of growing rams in terms of protein and mineral needs. *T. indica* can therefore be used as a suitable feed stuff for small ruminants during feed scarcity for improving the performance and productivity of ruminant livestock.

Acknowledgement

The authors are grateful to the Department of Animal Science, Bayero University, Kano for allowing them the use of the experimental animals in the conduct of the research.

Table 1: Gross composition (%) of diets fed growing Yankasa rams at graded levels of *Tamarindus indica* leaves

Ingredients	A (0%)	B (15%)	C (30%)
<i>Tamarindus indica</i>	0	15	30
Wheat offal	20	20	20
Rice milling waste	20	20	10
Cowpea husk	20	15	10
Cotton seed cake	20	15	15
Ground nut hay	20	15	15
TOTAL	100	100	100

Table 2: Proximate composition (%) of the experimental diet fed to growing Yankasa rams.

Parameters %	A (0%)	Treatment (15%)	B C (30%)	LSD
Ash	6.15 ^{ab}	7.46 ^a	5.27 ^b	1.99
Crude Protein	13.67	13.67	15.86	NS
Crude Fibre	19.12	22.05	17.67	NS
Ether Extact	10.98	13.95	6.56	NS
Nitrogen Free Extract	43.00	35.54	47.81	NS
Dry Matter	92.92	92.64	93.17	NS

a,b,c means in the same row with different superscripts are significantly different (P<0.05)
NS = Not significant

Table 3: Performance characteristics of growing Yankasa rams fed graded levels of *Tamarindus indica* leaves

Parameters	Treatment			LSD
	A	B	C	
Initial body weight (kg)	17.70	17.34	17.18	NS
Final body weight (kg)	20.60 ³	15.38 ^b	17.73 ^{ab}	5.16
Body weight gain (kg)	2.90 ^a	-2.00 ^b	0.55 ^{ab}	3.55
Average daily feed intake (g/day)	737.50 ^s	470.00 ^b	667.50 ³	171.41
Average daily ash intake (g/day)	45.38	34.93	35.18	NS
Average daily crude protein intake (g/day)	100.83 ³	64.23 ^b	105.88 ⁸	20.00
Average daily crude fibre intake (g/day)	141.03 ^a	103.65 ^b	117.96 ^{ab}	33.56 -
Average daily ether extract intake (g/day)	80.98 ^a	65.55 ^a	43.78 ^b	19.16
Average daily nitrogen free extract intake (g/day)	317.13 ^a	167.03 ^b	319.14 ^a	72.47
Average daily dry matter intake (g/day)	691.30 ^a	435.38 ^b	621.90 ³	165.97

a, b, c, means in the same row with different superscripts are significantly different (P<0.05) NS = Not significant

Table 4: The Nutrient digestibility by growing Yankasa rams fed graded levels of *Tamarindus indica* leaves

Digestibility index (%)	Treatments A			LSD
	B	C		
Ash digestibility	75.85	69.20	71.05	NS
Crude protein digestibility	92.16 ^{ab}	90.06 ^b	94.35 ^a	2.62
Crude fibre digestibility	90.44 ³	85.50 ^b	87.30 ^{ab}	3.63
Ether extract digestibility	95.60 ³	90.66 ^b	87.56 ^C	2.37
Nitrogen free extract digestibility	93.72 ^a	87.61 ^b	94.79 ^a	2.77
Dry matter digestibility	91.90 ³	86.49 ^b	91.39 ³	3.24

a, b, c, means in the same row with different superscripts are significantly different (P<0.05)

References

- Adeloye, A. (1998). The Nigerian Small Ruminants Species, Corporate Office, Max Press First Edition.
- Ahamefule, F. O., Ibeawuchi, J. A. and Ajala, A. A. (2002). Intake, digestibility and Nitrogen balance studies of potato peels, yeast slurry diets by WAD goats (eds) Aletor. V. A. and Onibi, G. E. *Proceedings of the 27th annual conference, NSAP. FUTA. March 17-21.*
- Aminu. H.I. (2010). Phyto-chemical analysis of common Galactagogues in the Sudan Savannah Zone of Nigeria. Unpublished B. Agriculture Research Project, submitted to the Department of Animal Science, Faculty of Agriculture, Bayero University, Kano. (April, 2010).
- A.O.A.C. (1990). Official Methods of Analysis 15th Edition, Association of Official Analytical Chemists Arlington V.A, U.S.A. 1094pp
- Babayemi, O.J., Ekokotu, O.A and U.A lyang (2009). Evaluation of ensiled Cassava peels together with Albizia Samam pods in: B.I Umoh, A.B.I Udedibie, LP Solomon, O.L Obasi, B.I Okon and E.J Udoh (eds). *Animal Agriculture and Global Food challenges. Proceedings of the 34th annual conference of the NSAP held at University of Uyo, Uyo, Akwa Ibom State, Nigeria: 544 - 546.*
- Fajemisin, A, N., Alokun J. A., Aro, S. O. Olowofeso, O. and Fawolu, T.S. (2008). Nutrient intake, digestibility and weight gain of West Africa Dwarf sheep Fed Rumens content-poultry dropping and mixed diets in: O .A Adeyemi, A .M. Ogungbesan, A. O Dada, O. O Eniolorunda H. A Awojobi, D. B. Oke and J. A Agunbiade (eds), *Animal Agriculture towards millennium Development in Nigeria. Proceedings of the 33rd Annual conference of NSAP held at college of Agricultural sciences, Olabisi Onabanjo University, Yewa campus, Ayetoro, Ogun State 583 - 586.*
- Garba, Y., Aminu, H.I. and Muhammad, I.R. (2010a). Anti-nutritive factors of common phyto-galactagogues in the Sudan Savanna Zone of Nigeria. In: Kwari, J.D. Dugje, I.Y. Gwary, M.M. Alhassan, A.B. Raji, A.O., Sotande, O.A., Mailafiya, D.M. and Sastawa, B.M (eds.). *Organic Agriculture; A panacea for sustainable Environment and food security. Proceedings of the 6th National Conference on organic Agriculture held at Faculty of Agriculture, University of Maiduguri, Maiduguri, 21st - 24th November, 64 - 67*
- Garba, Y., Muhammad, A. S., Muhammad, I. R. and Nasiru, A. (2010b). Intake and Nutrient digestibility by Yankasa rams fed graded levels of *Guiera senegalensis* as a complete diet in Babayemi, O.J, Abu, O.A and Ewuola, E.O (eds). *Fast-tracking Animal Agriculture in a Challenged Economy. Proceedings of the 35th annual conference of the Nigerian Society for Animal Production held at University of Ibadan, Ibadan, Oyo State, Nigeria: 143-146*

- KNARDA (Kano Agricultural and Rural Development Authority) (2001). Metrological Station Reports Temperature Record Book and Management Unit No. 11:1-3.
- Lamidi, A. A., Aina, A. B. J and Sowande, S. O. (2010). Nutrient digestibility and Nitrogen Balance in West African Dwarf Goats Fed blended diets for dry season, in Babayemi, O.J, Abu, O.A and Ewuola, E.O (eds). Fast-tracking Animal Agriculture in a Challenged Economy. Proceedings of the 35th annual conference of the Nigerian Society for Animal Production held at University of Ibadan, Ibadan, Oyo State, Nigeria: 499 -501
- Maigandi. S. A. and Wasagu. A. A. (2002). Nutrient intake and digestibility by Yankasa rams fed varying levels of *Ficus sycomorous* leaves, proceeding of the 27th conference Nigerian Society for Animal Production (NSAP) held at Federal University of Technology. Akure 182-184.
- Olafadehan. O.A, Olafadehan, O.O,Obun, C.O, Yusuf, A.M, Adeniji, A.A, Olayinka, O.O and B. Abdullahi (2009). in: J.A.Akinlade., T.B.Olayeni., T.A Rafiu., A.O Akinwunmi., O.A Aderinola., O.O Ojebiyi and Odunsi, A.A (eds.) Global Economic Recession and the Challenges to Livestock Production in Nigeria. Proceedings of the 14th annual conference of Animal Science Association of Nigeria held at Ladoke Akintola University of Technology, Ogbomosho, Oyo State, Nigeria: pp572 -574
- SAS institute Inc. (1999-2000). Statistical Analysis SAS/STAT. Guide for Personal Computers, Version 6th edition, Cary N. C. U.S.A Pp 967-798.
- Usman H. B., Maigandi, S. A., Hassan, W. A. and Daneji, A. I (2008). Growth performances and Nutrient Utilization by Sokoto red goat Kids fed fore stomach digesta as replacement for cowpea husk. *Nigerian Journal of Basic and Applied Science* 16(1):62-70.
- Yahaya, Y, Muhammad, I.R and Garba, Y. (2009). Survey of Plants used as Milk Enhancers in Birnin Gwari Local Government Area, Kaduna State, in Olojede, A.O, Okoye, B.C, Ekwe, K.C, Nwachukwu, I.N and Alawode, O. (eds). Global Food Crisis and Nigerian Agriculture. Proceedings of the 43rd annual conference of Agricultural Society of Nigeria held at National Universities Commission and Raw materials Research and Development Council, Abuja, Nigeria: 1018-1021