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Full Length Research Paper

Carcass characteristics of castrated West African Dwarf Bucks offered varying levels of Brewer's dried grain with Ber (*ziziphus jujube*) leaves basal diet

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The study investigated the carcass characteristics of castrated West African Dwarf bucks offered varying levels of brewer's dried grain with Ber (*Ziziphus jujube*) Leaves basal diet. Twelve West African Dwarf bucks with average age of Twelve months weighing 13 (+_0.7) Kg was used for the experiment. Each treatment was replicated three times. The experimental diets consisted of ber leaves (*Ziziphus jujube*) as basal diet, supplemented with local brewers' dried grain at 50g, 100 g, 150 g and 200 g levels designated as treatments T_1, T_2, T_3 and T_4 respectively. These diets were fed to the animals for a period of 63 days. At the end of the experiment, two animals from each treatment were selected, starved for a period of 24 hours and sacrificed for carcass analysis. Result of the research revealed that the weights of blood ranged from 485g (T_3) to 1.06 Kg (T_4). The values were statistically significant ($p<0.01$) across treatments. The Hides/skin, non carcass, digestive organs, fore and hind limbs weights were significantly ($p<0.01$) different across treatments. Effects of the diets on wholesale cuts of growing West African Dwarf goats showed that the weights for the breast, shoulder, legs, shanks, flanks, rack and loins with ranges of 195 – 290 g, 225 – 350g, 310 – 405g, 92.50 – 142.50g, 155 – 187.50g, 152.50 – 179.0g and 302.50 – 455.00 respectively were all significantly ($p<0.01$) different so also with the fat deposits. It is concluded that the experimental diets did not have harmful effects on the animals as indicated by the carcass qualities because of absence of excessive fat deposits. The feed ingredients could therefore be used at the rates used in the treatments for fattening of goats.

Keywords: Carcass, castrate, West African Dwarf goats, brewers dried grains and ber leaves

INTRODUCTION

Raising of goats occurs in many semi-arid regions (Andrade-Montemayor *et al*., 2011), since they show adaptability to regions with a low rainfall index and scarce forage availability. During the dry season, the goats consume low-quality feed as a consequence of low forage availability, thus resulting in a low productive performance. To make goat farming more profitable, especially during the long period of forage shortages, the feedlot farming system is presented as an alternative for improving production rates. In feedlot systems, feed planning is essential to reduce costs.

Feed intake is one of the most important factors for the productivity of small ruminants. If the voluntary intake is too low the rate of production will be depressed, resulting in requirements for maintenance becoming a very large proportion of the Metabolizeable energy consumed and so giving a poor efficiency of food conversion (Cassey and Niekerk, 1999). Three types of factors affecting feed intake of ruminants can be distinguished: factors that have to do with the animals, the feed characteristics or the environmental conditions (McDonald *et al*., 1995). Regulation of feed intake and dietary choices combine short-term control of feeding behaviour related to the body's homeostatic and long-term control that depends on nutritional requirements and body reserves (Fasae *et al*., 2007). Feed factors act mainly on the short-term control. Feed quality and physical characteristics of forage, such as a dry matter (DM) content, fibre content, particle size, and resistance to fracture are known to affect ease of prehension and thus intake rate (Devendra and Burns, 1995).

Meat is one of the most important foods in the world and in some countries; it is considered an essential product with high consumption rate (Ana *et al*., 2013). Differences in carcass, fat and conformation affect meat quality (Panea *et al*., 2011). Carcass dimensions give information on its development, helping in determining the main assessment indices (Eniolorunda *et al*., 2011). Carcass conformation is an important indicator of commercial value because carcass with better conformation has advantages of high lean content, proportion of high price cuts and greater muscle area (Kempster *et al*., 2012). A carcass composition determines yield and meat sensorial characteristics. Therefore carcass economic value is based on its conformation and composition (Defa and Teixeirra, 2008).

Sebsibe *et al*. (2007) reported that carcass conformation is a critical subjective visual criterion that places economic value to carcasses. That carcass conformation only account for less than 10% of the variation observed in meat yield. Information on carcass characteristics of castrated West African Dwarf bucks offered varying levels of brewer's dried grain with ber (*ziziphus jujube*) leaves basal diet is scanty. The study was therefore carried out to bridge this gap.

MATERIALS AND METHODS

Study area

The experiment was conducted at the Livestock Teaching and Research Farm of the Faculty of Agriculture, Adamawa State University Mubi, Nigeria. Mubi is located in the Northern part of Adamawa State. It lies on Latitude $90^{o}11^{I}$ north of the equator and Longitude $13^{o}45^{I}$ east of the Greenwich Meridian at an altitude of 696 m above sea level. It is bounded in the South and East by Republic of Cameroun. The State has a land area of 4,728.77m^2 and population of 245,460 (Saidu and Gadiga, 2004), it is situated in the Sudan Savanna zone of Nigeria. The vegetation type is best described as *Combretacious* woodland savanna (Areola, 1983) which consists of grasses or weeds and shrubs collectively making 70% of the entire vegetation. Some of these grasses, weeds and shrubs are used as animal feeds. The area has two distinct seasons; Rainy season lasts for four (4) months and dry season that lasts for eight (8) months. Annual rainfall ranges from 700-900mm with highest peak in August. The area has minimum temperature of 12.7°C in January and maximum of 37°C in April (Adebayo, 2004).

Sources of feeds

Feeds were obtained from two different sources in and around Mubi environs. The ber (*Ziziphus jujube*) leaves were obtained from the wild by lopping the trees and collecting the leaves and bagging after drying under the shade. Local Brewers' dried grains were bought from the local beer brewers.

Experimental animals and management

The experimental animals were bought from local markets in and around Mubi and Michika Local Government area, Adamawa State, Nigeria.

Twelve (12) West African Dwarf bucks with average age of Twelve (12) months weighing about (13±0.7) Kg were used for the experiments. The animals were then individually housed in wooden pens measuring 1.50 m^2 floor spaces and 1.50 m heights. The floor was made of concrete and covered with wood shavings to conserve heat and absorb animal urine. All the animals were dewormed, treated against ectoparasites; Beranil was used against hemoparasites and antibiotics were administered. At the end of the adaptation period of one week after healing from castration, they were tagged and randomly allocated to different experimental diets. They were weighed to obtain initial weights and balanced for the weights before embarking on data collection. There were four (4) treatments each replicated three times making twelve (12) experimental animals.

Experimental diets

The experimental diets consisted of ber leaves (*Ziziphus jujube*) as basal diet, supplemented with local brewers' dried grain at 50 g, 100 g, 150 g and 200 g designated as treatments T_1, T_2, T_3 and T_4 respectively as indicated in (Table 1). These diets were fed to the animals throughout the experimental period of 63 days.

Parameters determined

Animals were maintained under fasting conditions (with availability of drinking water) for up to 18 hours. The following measurements were taken.

Table 1. Composition of experimental diets.

	Treatments			
Feeds	**T_1**	**T_2**	**T_3**	**T_4**
BDG (g)	0	50	100	150
BL	*ad lib*	*ad lib*	*ad lib*	*ad lib*
Salt (NaCl) %	2	2	2	2

Table 2. Chemical composition of experimental feeds.

Parameters	Brewers' dried grain (BDG)	Ber leaves *(Ziziphus jujube)*
Dry matter (DM) %	9.00	85.79
Crude protein (CP) %	19.61	16.10
Crude fiber (CF) %	15.82	11.04
Ether extract (EE) %	6.50	4.40
Ash %	9.2	9.2

Pre-slaughter weight

Animals were weighed irnmediately before their slaughter and this was termed pre-slaughter weight. For slaughter, each animal was stunned by a blow on the head and bled by cutting the jugular vein. The *animal* was hanged in a head down position till the bleeding completely stopped. Two animals from each treatment group were randomly selected and slaughtered for carcass evaluation at the end of experimental period. The animals were slaughtered following the standard procedures. The bodies were skinned; the heads and feet were removed. The carcasses were eviscerated and the internal organs and tissues were weighed. All body components such as head, feet with hooves, skin, blood, kidneys, bladder, liver with bile, heart, lungs, spleen, pancreas, full and empty gut were weighed and their percentages with respect to the empty live weight of the animals were determined. Kidneys fat, heart fat, pelvic fat, and mesenteric fat were also weighed using sensitive balance. Full live weight, empty live weight, hot carcass weight, and hot dressing percentage were determined. Dressing percentage was calculated according to hot carcass weight and pre-slaughter live weight. One half of the carcass was separated into different primal cuts (leg, loin, rack, breast and shank and shoulder and neck). All data obtained were subjected to analysis of variance (ANOVA) using the SAS, (2001) package. Means were separated using the Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

The compositions of the experimental diets were as presented in (Table 1) while the chemical compositions of experimental diets were presented in (Table 2). The crude protein levels of supplemental feed (brewers' dried grain BDG) being 19.61% and basal feed *Ziziphus jujube* (16.10 %) were high enough to meet the nutritional requirements of goats (Devendra and Mcleroy, 1987). However, the crude fiber levels were lower than that required by the animals. Bhatta *et al.* (2005) reported that although fodder trees are often valuable sources of dietary protein and energy for livestock in semi-arid regions, maximum nutritional and economic benefits could be harvested, if used as supplement rather than as a sole feed. That tree leaves successfully replaced 50% concentrate in the ration of growing goats.

Effects of the diets on carcass characteristics of goats are shown in (Table 3). The weights of blood ranged from 485g (T_3) to 1.06 Kg (T_4). The values were statistically significant ($p<0.01$) across treatments. The Hides/skin, non carcass, digestive organs, fore and hind limbs weights were significantly ($p<0.01$) different across treatments. The values obtained in this study were similar to those reported by Ukanwoko *et al.* (2009), when they fed West African dwarf goats with cassava leaf- meal based diets. The similarities in this study may be due to the inclusion of the gut, head, legs and internal organs such as heart, kidney, lungs, spleen and liver in the dressed carcass. Cassey and Van Nickrek, (1999) had reported that dressing percentage can be influenced by many factors such as fleece and hide weight alimentary trait size and fill, slaughtering procedure and portioning of body fat. Also the dressing method can affect the dressing percentage because parts which are considered as offal may not be considered offal in some dressing methods. Fasae *et al.* (2007) considers hot carcass weight to be carcass weight that includes head, gastro intestinal tract but minus legs. However Ukanwoko *et al.* (2009) reported warm carcass weight to exclude all internal organs, skin, head, feet as well as the visceral and abdominal fat. This compared to the former will give a lower dressing percentage.

Effects of the diets on whole sale cuts of growing West

Table 3. Effects of Diets on Carcass characteristics of castrated West African Dwarf bucks.

	Treatments					
Parameters	**T_1**	**T_2**	**T_3**	**T_4**	**SEM**	**Sig. Lev.**
LV WT (Kg)	16.27^{b}	17.27^{a}	15.50^{c}	15.07^{d}	0.04	**
WT BLD (g)	492.50^{c}	1035.00^{b}	485.00^{d}	1060.00^{a}	3.88	**
WT SK (Kg)	1.40^{a}	1.30^{c}	1.33^{b}	1.37^{ab}	0.01	**
WT FLMB (Kg)	1.30^{c}	1.30^{c}	1.37^{b}	1.40^{a}	0.01	**
WT HLMB (Kg)	1.17^{c}	1.33^{a}	1.30^{b}	1.30^{b}	0.01	**
WT HD&LG (Kg)	2.77^{a}	2.47^{b}	1.47^{c}	2.50^{ab}	0.15	**
TRACH (g)	42.50^{d}	57.50^{c}	61.00^{b}	75.00^{a}	1.32	**
LNG (g)	75.00^{d}	127.50^{b}	82.50^{c}	140.00^{a}	1.50	**
LIVER (g)	165.00^{c}	245.00^{ab}	247.50^{a}	205.00^{b}	6.49	**
KIDNEY (g)	32.50^{c}	62.50^{a}	52.50^{b}	52.50^{b}	0.11	**
HEART (g)	35.00^{b}	57.50^{a}	57.50^{a}	32.50^{c}	0.91	**
SPLEEN (g)	22.50^{d}	41.00^{b}	32.50^{c}	55.00^{a}	0.91	**
PANCREAS (g)	32.50^{b}	35.50^{ab}	35.00^{ab}	36.50^{a}	0.89	**
OESOPH (g)	135.00^{b}	142.50^{a}	125.00^{c}	137.50^{ab}	2.67	**
RET/RU (g)	55.00^{c}	62.50^{b}	62.50^{b}	92.50^{a}	0.91	**
RUMEN (g)	235.00^{c}	275.00^{c}	325.00^{b}	355.00^{a}	1.44	**
OMASUM (g)	72.50^{c}	97.50^{b}	147.50^{a}	92.50^{b}	0.83	**
ABOMASUM (g)	47.50^{d}	85.00^{c}	92.50^{b}	102.50^{a}	0.91	**
SMALL INT (g)	225.00^{b}	182.50^{d}	215.00^{c}	252.50^{a}	1.25	**
LARGE INT (g)	127.50^{a}	92.50^{d}	122.50^{b}	108.00^{c}	0.79	**
BREAST (g)	195.00^{c}	290.00^{a}	205.00^{bc}	210.00^{b}	2.50	**
SHOULDER (g)	350.00^{a}	265.00^{b}	225.00^{d}	245.00^{c}	2.17	**
LEGS (g)	310^{d}	405.00^{a}	340.00^{c}	355.00^{b}	4.86	**
SHANK (g)	92.50^{d}	142.50^{a}	112.50^{c}	115.00^{b}	0.36	**
FLANK (g)	155.00^{c}	187.50^{a}	175.50^{b}	187.00^{ab}	1.06	**
RACK (g)	152.50^{d}	179.00^{a}	172.50^{b}	165.00^{c}	0.71	**
LOIN (g)	395.00^{b}	302.50^{c}	455.00^{a}	455.00^{a}	6.75	**
FAT DEP (g)	155.00^{d}	405.00^{b}	415.00^{a}	380.00^{c}	3.20	**

abc: Means with different superscripts within a row are significantly different ($P<0.05$), SEM: Standard Error of Means.

African Dwarf goats showed that the weight for the breast, shoulder, legs, shanks, flanks, rack and loins with ranges of 195– 290 g, 225 – 350 g, 310 – 405 g, 92.50 – 142.50 g, 155–187.50g, 152.50 – 179.0g and 302.50 – 455.00 respectively were all significantly ($p<0.01$) different so also with the fat deposits. Nowadays consumers are highly interested in the quality of the products they eat, especially when this refers to meat. These results could be due animals' genetic status which could influence carcass characteristics, chemical composition and fatty acid profiles.

Conclusion

It can be concluded that the experimental diets did not have harmful effects on the animals as indicated by the blood profiles. Meat quality is also adequate because of absence of excessive fat deposits. The feed ingredients could therefore be used at the rates used in the treatments for fattening of goats.

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Authors' declaration

We declared that this study is an original research by our research team and we agree to publish it in the journal.

REFERENCES

Adebayo AA (2004). *Mubi Region: A geographical synthesis.* Department of Geography, Federal University of Technology, Yola, Nigeria. Published by Paraclette Publishers Yola. Pp. 32-33.

Andrade-Montemayor HM, Cordova-Torres AV, García-Gasca T, Kawas JR (2011). Alternative foods for smallruminants in semiarid zones, the case of Mesquite (*Prosopis laevigata*spp.) and Nopal (Opuntia spp.). *Small Ruminant Research,* (98):83-92. Available from: <http://www.smallruminantresearch. com/article/S0921

4488(11)00098-8/abstrat>. Accessed: Jan. 22, 2016. doi: 10.1016/j.smallrumres.2011.03.023.

Ana G, Maribel VV, Mari MC, Sanudo C (2013). ActaScientarum. Animal Sciences. 35(4):335-347.

Areola OO (1983). Soil and Vegetable Resources in: Geography of Nigeria Dev. Heineman, Ibadan. Pp26-40

Bhatta R, Vaithiyanathan S, Singh NP, Shinde AK, Verma DL (2005). Effect of feeding

tree leaves as supplements on the nutrient digestion and rumen fermentation pattern in sheep grazing on semi-arid range of India – I. *Small Ruminant Research*. 60 (3): 270-280.

Cassey NH, Niekerk VWA (1999). The Boer goat, growth, nutrient requirements and meat quality. Performance test and origin. University of Pretoria, South Africa. (*http://* www.boergoat.com Retrieved: 10/1/2007.

Defa R, Teixeirra A (2008). Sheep carcass quality. In: Sheep meat carbo, 373-400.

Devendra C, Burns M (1995).*Goat production in the tropics*.Commonwealth Agricultural Bureau, Fanham house, United Kingdom. Pp 95-105.

Devendra C, Mcleroy GB (1987). *Goat and Sheep production in the tropics*. Intermediate

TropicalAgriculture series, Longman, Scientific and technical, Singapore, Commonwealth agricultural Bureau, Fanham House, U.K. Pp. 55-73.

Duncan DB (1955). Multiple Ranges and Multiple F-tests Biometrics 11: 1-42.

Eniolorunda OO, Apata ES, Okubanio AO (2011). Body and carcass measurements of

Rams fed graded Levels of Biscuit wastes based diets. *African Journal of feed Science*, 51:333.

Fasae OA, Adu IF, Aina ABJ, Deo MA (2007). Carcass Yield and composition of West African dwarf rams. *Trop. J. of Animal science.* 10(1-2):225-229.

Kempster AJ, Cuthbertson,A. and G. Harington (2012). Relationship between conformation, the yield and Distribution of Lean meat in the Carcass of pigs, cattle and sheep. Meat Science, 6:37-53.

McDonald P, Edward RA, Greenhalgh JFD, Morgan CA (1998). *Animal nutrition* 5th *Edition*. Published by Longman, London. Pp 177-218.

Panea B, Alberti P, Olleta JL, Campo MM, Ripoll G, Attariba J, Sanudo C (2011). Intra breed variability and Relationship for carcass traits in cattle. *Spanish Journal of Agricultural Science* 6(4):546-558.

Saidu I, Gadiga BL (2004). Population: A write up in Mubi region A geographic synthesis by Adebayo AA, Department of geography, Federal University of Technology, Yola. Published by Paraclette Publishers, Yola. Pp. 117-119.

SAS (2001). *Statistical Analysis System*, SAS 2001, SAS/STAT Software Release 8.02, SAS Institute Inc. Cary, NC. USA.

Sebsibe A, Casey NH, van Niekerk WA, Tegegne A, Coertze R.J (2007). Growth performance and carcass characteristics of three Ethiopian goat breeds fed grain less diets varying in concentrate to roughage ratios. *South African Journal of Animal Science*; 37:221-32.

Ukanwoko AI, Ibeawuchi JA, Ukachukwu NW (2009). Growth performance and carcass characteristics of West African dwarf goats fed cassava peal meal based diet. *Proceeding at the 34th annual conference of the Nigeria society for Animal production* Uyo, March 2009. Pp. 476-479.