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Research Article

Carcass Characteristics of Intact West African Dwarf Bucks Offered Varying Levels of Brewer's Dried Grain with Ber (Ziziphus Jujube) Leaves Basal Diet

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Abstract

The present 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, 100g, 150g and 200g levels designated as treatments T1, T2, T3 and T4 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 (T3) to 1.06 Kg (T4). 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 whole sale 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 – 290g, 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; Ber Leaves

Introduction

Raising of goats occurs in many semi-arid regions [1], 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 [2]. 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 [3]. 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 [4]. 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 [5].

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 [6]. Differences in carcass, fat and conformation

affect meat quality [7]. Carcass dimensions give information on its development, helping in determining the main assessment indices [8]. 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 [9]. A carcass composition determines yield and meat sensorial characteristics. Therefore, carcass economic value is based on its conformation and composition [10].

[11] 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 site

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 90o11I north of the equator and Longitude 13o45I east of the Greenwich Meridian at an altitude of 696m above sea level. It is bounded in the South and East by Republic of Cameroun. The State has a land area of 4,728.77m2 and population of 245, 460 [12], it is situated in the Sudan Savanna zone of Nigeria. The vegetation type is best described as Combretacious woodland savanna [13], 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 12.70C in January and maximum of 370C in April [14].

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 grain was 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 1.50m2 floor spaces and 1.50m 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 hemo-parasites 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 50g, 100g, 150g and 200g designated as treatments T1, T2, T3 and T4 respectively as indicated in Table 1. These diets were fed to the animals throughout the experimental period of 63 days.

Table 1: Composition of experimental diets.

	Treatments			
Feeds	T1	T2	T3	T4
BDG (g)	0	50	100	150
BL	ad lib	ad lib	ad lib	ad lib
Salt (NaCl) %	2	2	2	2

Parameters determined

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

- Pre-slaughter weight: Animals were weighed immediately 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 [15] package. Means were separated using the Duncan's multiple range test [16].

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 [17]. However, the crude fiber levels were lower than that required by the animals [18]. 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 (Table 1,2).

Table 2: Chemical Composition of experimental feeds.

Parameters	Brewers' dried grain (BDG)	Ber leaves (Ziziphus jujube)
Dry matter (DM) %	9	85.79
Crude protein (CP) %	19.61	16.1
Crude fiber (CF) %	15.82	11.04
Ether extract (EE) %	6.5	4.4
Ash %	9.2	9.2

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

Parameters	Treatments									
	T1		T2		T3		T4		SEM	Sig. Lev.
LV WT (Kg)	16.27b		17.27a		15.50c		15.07d		0.04	**
WT BLD (g)	492.50c	1035.00b	485.00d	1060.00a	3.88		**			
WT SK (Kg)	1.40a		1.30c		1.33b		1.37ab		0.01	**
WT FLMB (Kg) 1.30c		1.30c		1.37b		1.40a		0.01		**
WT HLMB (Kg) 1.17c	1.33a		1.30b		1.30b		0.01		**	
WT HD&LG (Kg) 2.77a	2.47b		1.47c		2.50ab		0.15		**	
TRACH (g)	42.50d		57.50c		61.00b		75.00a		1.32	**
LNG (g)	75.00d		127.50b	82.50c		140.00a	1.5		**	
LIVER (g)	165.00c	245.00ab	247.50a	205.00b	6.49		**			
KIDNEY (g)	32.50c		62.50a		52.50b		52.50b		0.11	**
HEART (g)	35.00b		57.50a		57.50a		32.50c		0.91	**
SPLEEN (g)	22.50d		41.00b		32.50c		55.00a		0.91	**
PANCREAS (g) 32.50b	35.50ab		35.00ab		36.50a		0.89		**	
OESOPH (g)	135.00b	142.50a	125.00c	137.50ab	2.67		**			
RET/RU (g)	55.00c		62.50b		62.50b		92.50a		0.91	**
RUMEN (g0	235.00c	275.00c	325.00b	355.00a	1.44		**			
OMASUM (g)	72.50c		97.50b		147.50a	92.50b		0.83		**
ABOMASUM (g) 47.50d	85.00c		92.50b		102.50a	0.91		**		
SMALL INT (g) 225.00b	182.50d	215.00c	252.50a	1.25		**				
LARGE INT (g) 127.50a	92.50d		122.50b	108.00c	0.79		**			
BREAST (g)	195.00c	290.00a	205.00bc	210.00b	2.5		**			
SHOULDER (g) 350.00a	265.00b	225.00d	245.00c	2.17		**				
LEGS (g)	310d		405.00a	340.00c	355.00b	4.86		**		
SHANK (g)	92.50d		142.50a	112.50c	115.00b	0.36		**		
FLANK (g)	155.00c	187.50a	175.50b	187.00ab	1.06		**			
RACK (g)	152.50d	179.00a	172.50b	165.00c	0.71		**			
LOIN (g)	395.00b	302.50c	455.00a	455.00a	6.75		**			
FAT DEP (g)	155.00d	405.00b	415.00a	380.00c	3.2		**			

abc: Means with different superscripts within a row are significantly different (P<0.05),

SEM: Standard Error of Means.

Effects of the diets on carcass characteristics of goats are shown in Table 3. The weights of blood ranged from 485g (T3) to 1.06 Kg (T4). 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 [19], 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. [2] 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 (Table 3).

For instance, [4] considers hot carcass weight to be carcass weight that includes head, gastrointestinal tract but minus legs. However, [19] 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 African dwarf goats showed that the weight for the breast, shoulder, legs, shanks, flanks, rack and loins with ranges of 195 – 290g, 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. 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 and Recommendation

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.

Acknowledgement

None.

Conflicts of Interest

No conflict of interest.

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