

CARCASS YIELD OF WEST AFRICAN DWARF GOAT FED MIXED FORAGES AND BREWERS' SPENT GRAIN

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ABSTRACT

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Sixteen West African Dwarf goats were used to evaluate the effect of feeding mixed forages-brewers' spent grain diets on their carcass yield. The goats were randomly assigned to four treatment diets: T1- *Gliricidia sepium* (*G. sepium*) forage + 200 g brewers' spent grain (BSG); T2- *Panicum maximum* (*P. maximum*) grass + 200 g BSG; T3- *G. sepium* + *P. maximum* + 200 g BSG; and T4- *G. sepium* + *P. maximum* (Control), with four goats per diet for 56 days. Data were collected on dry matter intake, weight, and carcass yield. The results showed that animals on Control (T4) recorded the highest (388.32 g/d) significant ($P < 0.05$) intake while T1 had the lowest (235.91 g/d) dry matter intake (DMI). In terms of weight gain T3 recorded the highest (78.93 g d⁻¹) significant ($P < 0.05$) value while the least (-28.39 g d⁻¹) was observed in T4. Animals on diet 3 (T3) recorded the highest numerical (42.22 %) yield of average carcass while the least (37.76 %) was seen in T1. Also, for condition scores, T3 animals recorded the best. The results thus revealed that supplementing grasses together with browses and agro industrial by-products will surely go a long way in improving the carcass yield of goats.

Keywords: WAD goat, weight gain, carcass yield, forages, spent grain

INTRODUCTION

The demand for meat from goat obviously is alarming as seen in major cities of Nigeria. This probably could be as a result of its potential that is not to be ignored when compared to other meats. However, goat production in Nigeria is characterized by low productivity levels due to nutritional constraints (Tolera et al. 2000), resulting in low production and reproductive performance, slow growth rate, loss of body condition and increased susceptibility to diseases and parasites. Though dwarf goats could feed on almost any feedstuffs, there seems to be an inter-relationship between the different diets/feeds (pasture, browses and concentrates and their mixtures) their effect their on body condition, carcass yield and quality.

Goat meat evaluations have received little attention and as a result knowledge of yield and quality of goat meat is given little consideration when compared to mutton and beef (Warmington and Kirton, 1990; Anous and Mourad, 1993; Pinkerton, 2003). Therefore, there is need for performance evaluations and designing of appropriate improvement breeding methods for goats (Bourdon, 2000; Jansen and Burg Kees, 2002). The dressing percentage of slaughter goats may be influenced by age, feed, weight, sex, body condition, amount of gut fill at slaughter, whether the carcass is weighed hot or cold and by the number of body components included in the yield calculation (Pinkerton, 2003). The study was therefore, designed to determine the effect of feeding mixed forages-brewers' spent grain on the carcass yield, wholesale cuts and offal of the West African Dwarf (WAD) goat.

MATERIALS AND METHODS

The study was carried out at the Goatry Unit of the department of Animal Science, University of Uyo, Uyo, Akwa Ibom state. A total of sixteen Wad goats (8 bucks, 8 does) aged 6 – 9 months with an average initial body weight of 9.36 ± 0.04 kg were purchased from small holder farmers in Uyo. They were treated for parasites and vaccinated against Peste des petite ruminante (PPR). They were divided into four (4) treatments of four goats each with each group comprising 2 bucks and 2 does and randomly assigned to the following 4 experimental diets: Diet1- *Gliricidia sepium* forage + 200 g Brewers' Spent Grains (BSG); Diet2- *Panicum maximum* grass + 200 g BSG; Diet3- *Gliricidia sepium* + *Panicum maximum* + 200 g BSG; and Diet4- *Gliricidia sepium* + *Panicum maximum*. At the end of the feeding trial, with two animals randomly taken from each diet (i.e. a buck and a doe) slaughtered and skinned and the carcass together with the offal and visceral were harvested and weighed. Condition scores were determined on a scale of 1 – 5 (i.e. skinny to fleshy/heavy muscled).

Statistics analysis

Data collected on daily feed intake, body weight gain and weight of the meat cuts were subjected to statistical analysis according to the Statistical Analysis System (SAS, 1999). The experimental design was completely randomised.

RESULTS AND DISCUSSION

Data on dry matter intake (DMI) of WAD goats fed the mixed forages-brewers' spent grain are presented in Table 1. Amongst the groups there were significant differences ($P < 0.05$) in the intakes. The highest DMI of 388.32 g/d was observed for animals on control. The values reported here were higher than those observed by Ifut (1987) and lower than those of Ajayi *et al.* (2005). The effect of the feeding regime on body weight as seen in Table 2, showing mean weekly body weight changes supports the claims of Tolera *et al.* (2000), and Okello *et al.* (1996) that supplementation of forages with concentrates feedstuffs would be an important step in enhancing the productivity of goats. This is evident in goats on diet 3 which had significantly ($P < 0.05$) higher weight gain (78.93 g d⁻¹) than those on other diets. This value was higher than the value of 23.81 g/d reported by Ajayi *et al.* (2005) for goats fed *G. sepium*, *P. maximum* and concentrates. This higher growth rate may be attributed to a higher protein and energy supply from the BSG, which impacted efficiency of nutrient utilization (Tolera *et al.* 2000). The lowest value of -28.39 g/d was observed for animals on Control (T4), which incidentally recorded the highest DMI. This may be attributed to an unfavourable energy to protein ratio obtained from the diet. The efficiency of utilization of the various diets amongst the goats as seen in Table 2, recorded that animals on diet 3 performed better than others at 4.37, while the least (-94.97) was observed in animals on diet 2.

Table 1: Dry matter content of various diets and Total intake (g d⁻¹) of WAD goats

Feeds(g/d)	Diets			
	Diet1	Diet2	Diet3	Diet4
<i>G. sepium</i>	80.93	-----	36.86	107.57
<i>P. maximum</i>	-----	97.57	137.88	280.75
BSG	154.98	139.85	170.48	-----
Total DMI	235.91 ^c	237.42 ^c	345.22 ^b	388.32 ^a
SEM	18.50	10.56	24.62	43.27

a,b,c = Means on the same row with different superscripts are significantly different ($P < 0.05$)

G. - *Gliricidia*; P. - *Panicum*; BSG - *Brewers' Spent Grains*; DMI - *Dry Matter Intake*; SEM - *Standard Error of Means*

Table 2: Mean weekly weight changes (g) of WAD goats fed forages and BSG

Week	Diet1	Diet2	Diet3	Diet4
1	10	-100	10	-220
2	30	40	-20	-360
3	130	210	390	-270
4	400	100	580	-400
5	360	110	540	-260
6	350	-140	830	-70
7	40	-270	840	370
8	410	-10	1250	360
ΣX	1730	-140	4420	-1590
	216.30 ^b	-17.50 ^c	552.50 ^a	-198.75 ^{cd}
Ave wt gain(g/d)	30.90	-2.50	78.93	-28.39
SEM	63.43	54.73	402.19	232.76
Feed: Gain	7.63	-94.97	4.37	-13.68

a,b,c = Means on the same row with different superscripts are significantly different ($P < 0.05$)

X- Mean; Ave wt - Average Weight; SEM - Standard Error of Mean.

Table 3 shows the carcass yield (Dressing out percent) which is a measure of amount of useful product (meat) derivable from the goats. Goats on Diet 3 recorded the highest average carcass yield of 42.22 %. This is attributed to the effect of the Diet. Values for Diets 1, 2, and 4 were 37.76 %, 40.03 % and 40.88 %, respectively. These values were close to those of Dadi *et al.* (2005) which ranged from 41.00 % to 45.90 % for Borana and Arsi-Bale goats fed forages and supplemental concentrates while the values reported by Okello *et al.* (1996) were higher at 53.00 % - 58.50 % in intact Mubende goats. Values obtained for Diet 1 were not in agreement with those of Chadhokar (1982) who reported that *G. sepium* supplementation up to the level of 80 % with low quality basal feed gave a carcass yield of 51.00 % in ewes and lambs. However, for Diet 3 the value falls within the range of that obtained by Dadi *et al.* (2005). In addition, Sharma (2003) stated that the dressing percent of goat varies from 43 - 48 %. The male goat on Diet 3 falls within the range of Sharma (2003). From table 3, the sex of the goats tended to have a great influence on the carcass yields. For goats on Diets 1, 2, and 3, the bucks possessed a higher numerical carcass yields than the does. This confirms the statement by Casey (1987) that the sex of an animal influences the carcass yield. Male animals often have thick muscles than the female ones, hence, yield more meat than the females (Casey, 1987) while the female animals always possess more fat than the males. Goats on Diets 1, 2, and 4 showed a positive response to condition scoring. The carcass yields of goats on these Diets increased with the condition scores. The reverse was obtained in Diet 3 where the does with a condition

score of 3.5 had a carcass yield of 40.66 % while the bucks had a score of 3.4 with a carcass yield of 43.77 %. A similar paradox was reported by Okello *et al.* (1996) in which omental fat deposition was implicated, which is higher in the female goat (Diet 3) than in the male.

Table 3: Carcass yield (dressing out percent) of WAD goats fed forages and BSG

Diet	Sex	L.Wt (Kg)	Carcass wt(Kg)	Offal Wt(Kg)	Dress (%)	Av. D. Wt.(%)	Offal (%)	Av offal (%)	Condition Score	Fat
1	Male	10.10	4.20	5.90	41.58	37.76	58.42	62.24	2.6	+
	Female	10.90	3.70	7.20	33.94		66.06		2.3	+
2	Male	9.40	4.00	5.40	42.55	40.33	57.45	59.98	3.0	+
	Female	12.00	4.50	7.50	37.50		62.50		2.4	-
3	Male	13.25	5.80	7.45	43.77	42.22	56.23	57.78	3.4	++
	Female	9.10	3.70	5.40	40.66		59.34		3.5	++++
4	Male	9.40	3.10	6.30	39.36	40.88	60.64	59.12	2.1	+
	Female	12.50	5.30	7.20	42.40		57.50		3.3	+++

L.Wt – Live Weight; Av. D. – Average; D - Dressing weight

CONCLUSION

The study showed that the inclusion of 200 g brewers' spent grains in the diets (*Gliricidia sepium* and *Panicum maximum*) of the West African Dwarf goats heralded positive effect in the carcass weights, carcass yields and offals even though there were no significant diet effect. Hence, an increased level of Brewers' spent grains supplementation is proposed for further studies.

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