
CARCASS YIELD OF WEST AFRICAN DWARF (WAD) BUCKS FED *GMELENA ARBOREA* LEAVES SUPPLEMENTED WITH BREWER'S DRIED GRAIN (BDG) AND MAIZE OFFAL IN EQUAL PROPORTION.

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ABSTRACT

The study was conducted to evaluate the effect on carcass, and visceral organs of the West African Dwarf (WAD) goat fed *Gmelina arborea* leaves supplemented with brewer's dried grain (BDG) and maize offal in equal proportion. Twenty (20) West African Dwarf bucks with average weight of 8.04 kg were randomly allocated to four treatments with five animals per treatment in a complete CRD. Treatment one (T1) was given *Gmelina arborea* leaves ad libitum. Animals on treatment two (T2), three (T3) and four (T4) were fed 100, 200, and 300 g/head/day of a mixture of Brewers dried grain and maize offal and *Gmelina arborea* leaves ad libitum. The chemical composition of diets during the study shows that parameters across the treatments were significantly affected ($P < 0.05$). Significant difference was observed across treatments in the head weight and the dressed carcass weight. It was observed that T1, which received only *Gmelina arborea* leaves i.e 0% MO/BDG, consistently showed the lowest values in the most parameters of carcass yield. Treatments on concentrate mixture i.e T2, T3 and T4 with 100% MO/BDG, 200% MO/BDG and 300% MO/BDG respectively showed the best performance. The superiority of T2, T3 and T4 was also shown clearly in dressed carcass. It seemed that animals on diets containing MO/BDG better utilized feed for meat production.

Key words: WAD, *Gmelina arborea*, brewers dried grain, maize offal, carcass, visceral organs

INTRODUCTION

Domestic goats (*Capra hircus*, L.) are important and adaptable domesticated animals that provide products to humans which include meat, milk, skin and hair (Abdel Aziz, 2010). Nutrition is a major problem of ruminant animal production in Nigeria. In the northern part where over 80% of ruminants are found is faced with severe feed shortage during the dry season and the available forages are of low quality, resulting in reduced feed intake, weight loss and high mortality-rate.

Multipurpose trees and shrubs are important feed resources for bridging the seasonal deficit in feed quantity and quality (Okagbare *et.al.*, 2005). Scarcity and high cost of feed stuffs have led animal nutritionist and researchers to look for unconventional and cheap sources of feeding materials Adesin 2000, Esonu *et al.* 2011.

Gmelina arborea is a perennial leguminous tree which is notable for its fast growth, large green leaves and high dry matter yield (Ademosum, 1988). *Gmelina arborea* leaves are considered good for ruminant because of its crude protein content of 11.9%. The proximate composition showed that *Gmelina arborea* has 73.71, 5.39, 13.60, 17.15, 23.00, 65.14, 32.30 and 34.48% of DM, ASH, EE, CF, CP, NDE, ADF and AFE, respectively (Amata and Lebari). Amata and lebari (2012) indicated that *Gmelina arborea* leaf meal contains average tanins, saponins, alkaloids, oxalate and trypsin inhibitors of 0.124, 0.313, 0.695, 0.112 and 0.021 mg/100 g of oven dried leaf sample. In a study carried out by Offor (2014), it was revealed that mature leaves of *Gmelina arborea* contained higher levels of Saponins compared to the value by Amata and Labari (2012). The high composition of saponins and glycosides in mature *Gmelina arborea* leaves gives it the bitter taste. Okagbare *et al.* 2005 indicated that goats fed *Gmelina arborea* leaves alone lost weight which was attributed to inadequate energy intake by the goats to meet their requirement for maintenance.

Brewers dried grain (BDG) is the residue of cereal grain which resulted from the manufacture of beer. It is a rich source of essential fatty acid and vitamins especially the B-complex vitamins (Gohl, 1981). Brewers dried grain obtained at the Benue Brewery Limited, Makurdi according to Dubaja (1976) is a by-product of beer fermentation which is recovered from the fermentation vats by centrifugation and cooling. Once all sugars have been removed from the grain, the residue is high in protein and fibre that is suitable to feed ruminants. The protein of the brewers dried grain have been shown to be

resistance to ruminal degradation (Satter and Whitlow, 1977, Merchen *et al.*1979). BDG composition and nutritional value depends on the grain used, (barley, maize and rice), the industrial processing method (temperature, fermentation) and the method of preservation. On a dry matter basis. Maize offal also known as Dusa, a by- product of maize grain obtained after dehulling. The maize is rich in crude protein (cp) and energy (McDonald *et al.* 1999) and abundantly available in all the geopolitical zones in Nigeria. It is used to replace other energy sources in the diet of poultry, swine and rabbit (Vantsawa *et al.*, 2007). There is little information on the utilization of brewers dried grain and maize offal mixed in equal proportion and fed at different levels as supplement to *Gmelina arborea* in goats. This paper was therefore designed to evaluate the effect on carcass and visceral organs of West African Dwarf weaner bucks fed *Gmelina arborea* leaves alone and different levels of mixture of Brewers dried grain and maize offal (1:1) as supplement.

MATERIALS AND METHODS

The experiment was conducted in the Small Ruminant Unit of Akperan Orshi College of Agriculture, Yandev-Gboko, Benue State. Yandev is located in Benue State within the Southern Guinea Savannah Agro ecological Zone of Nigeria. It lies between longitude 9° 02'E and latitude 7° 21' North of equator. The area is characterized by 6-7 months of rainfall which ranges from 1350 – 1400mm. the ambient temperature ranges from 34°C-36°C with the highest in March, the lowest mean monthly temperature ranged of 26°C-28°C occurs in December and January (TAC, 2002). The relative humidity is highest (69%) in August and September and lowest (39%) in January and February.

The maize offal (MO) used in this study was procured at Gboko Market, while Brewers Dried Grain (BDG) was purchased from Benue Brewery limited (BBL), Makurdi. The maize offal and Brewers Dried Grain were sun dried and mixed at a ratio of 1:1 (i.e 49.75 % of MO and 49.75 % of BDG with 0.5 % of table salt. The experimental diet is shown in Table 1.

Table 1: Composition of Supplemental Diet

Ingredient	% Composition
Maize offal	49.75
Brewers dried grain	49.75
Common salt	0.50
Total	100

Twenty (20) growing West African dwarf (WAD) bucks with average body weight of 8.04 kg were procured from Gboko and its environs. They were vaccinated against Pests des Petits Ruminat (PPR), dewormed and deticked using *ivermectin* preparation before the feeding trial. Routine hygiene and medication to guard against endo and ecto parasites were taken throughout the study period. The animals were randomly allocated to four treatment diets which was replicated five times with each animal serving as a replicate in each treatment.

Experimental Diets

Diet I = 1000 g of *Gmelina arborea* leaves *ad Libitum*

Diet II = 100 g of concentrate mixture of MO/BDG which was offered three hours before serving them with the 1000 g of the *Gmelina arborea* leaves.

Diet III = 200 g of concentrate mixture of MO/BDG which was offered three hours before serving them with 1000 g of the *Gmelina arborea* leaves on.

Diet IV = 300 g of concentrate mixture of MO/BDG which was offered three hours before serving them with 1000 g of the *Gmelina arborea* leaves.

Fresh leaves of *Gmelina arborea* which served as the basal diet were harvested within Akperan Orshi College of Agriculture Yandev – Gboko every morning, washed, weighed and fed fresh to the goats. (T₁) was fed only fresh leaves of *Gmelina arborea ad libitum*. T₂, T₃ and T₄ were fed 100 g, 200 g and 300 g of the concentrate mixtures and *Gmelina arborea* leaves was also fed three hours after the concentrate feed was given to them. The animals were given clean water *ad libitum*. Left over were carefully collected and weighed and feed intake by difference (feed offered less the left-over) was determined. The study lasted for 98 days after an adjustment period of 14 days.

Data obtained for the parameters were subjected to the analysis of variance (ANOVA) and where significant difference occurred, the means were separated using Duncan's Multiple Range Test (DMRT) according to the procedures outlined by Steel and Torrie (1991).

$$\text{Carcass Yield} = \frac{\text{Dressed weight}}{\text{Fasted weight}} \times 100$$

RESULTS AND DISCUSSION

The proximate composition of feed ingredients and experimental diet are shown in Table 2. The result on carcass and visceral organs are presented in table 3.

Table 2: Proximate Composition of Dietary Ingredient and Supplement (Dry Matter Basis)

Constituent (%)	<i>Gmelina arborea</i>	Brewers Grain	Dried Maize Offal	Supplement (50:50 BDG/MO)
Dry Matter	29.59	86.62	89.62	85.95
Crude protein	3.00	10.02	11.53	22.33
Crude fibre	10.31	3.36	7.06	6.14
Ether extract	2.60	2.10	6.14	10.86
Ash	3.33	2.81	5.45	4.12
NFE	11.23	67.21	59.45	45.50

Table 3: Effect of *Gmelina Arborea* Leaves Supplemented with Maize/Brewers Dried Grain on the Carcass, Visceral Organs of Wad Goats

Parameters	Diets				SEM
	T ₁	T ₂	T ₃	T ₄	
Head (g)	553.45 ^b	689.15 ^a	683.75 ^a	716.60 ^a	8.41*
Legs (g)	186.35	231.40	227.85	193.60	3.98 ^{ns}
Dressed Carcass Weight (kg)	2.65 ^b	3.99 ^a	4.54 ^a	4.09 ^a	0.07*
Heart (g)	33.60	48.40	55.60	51.80	2.12 ^{ns}
Lung/Trachea(g)	96.40	121.35	109.70	106.40	3.64 ^{ns}
Liver (g)	104.00 ^b	131.85 ^a	130.00 ^a	143.60 ^a	2.52*
Kidney (g)	33.19	35.60	36.40	36.50	0.45 ^{ns}
Large Intestine(g)	26.40	38.80	42.30	43.65	1.26 ^{ns}
Small Intestine(g)	220.15 ^b	349.60 ^a	380.30 ^a	352.45 ^a	4.83*
Stomach (g)	262.35	311.10	323.60	327.60	8.01 ^{ns}

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

* = significant

ns = Not significant (P>0.05)

SEM = Standard error of mean

T₁ = 0% maize offal/Brewers Dried Grain

T₂ = 100% maize offal/Brewers Dried Grain

T₃ = 200% maize offal/Brewers Dried Grain

T₄ = 300% maize offal/Brewers Dried Grain

The results showed that Significant differences were observed across treatments in the head weight and the dressed carcass weight. It was observed that T₁, which received only *Gmelina arborea* leaves i.e 0% MO/BDG, consistently showed the lowest values in the most parameters of carcass yield. Treatments on concentrate mixture i.e T₂, T₃ and T₄ with 100% MO/BDG, 200% MO/BDG and 300% MO/BDG respectively showed the best performance. The superiority of T₂, T₃ and T₄ was also shown clearly in dressed carcass. It seemed that animals on diets containing MO/BDG better utilized feed for meat production, particularly T₃ (200% MO/BDG). Significant differences were not observed on the legs weight across treatments, all values for treatment diet with MO/BDG were highest and T₁ values were lowest. This also may be probably indicating that diet containing MO/BDG had better feed utilization for meat production. Abnormal blood circulation would cause variation in the size of the heart Ahamefule (2010). Non significance variation between the values for heart is an indication that blood circulation among the dietary group was normal.

Similarities in the values of lungs/trachea across treatments show that the animals were receiving enough ventilation. The kidney on the other hand is an excretory organ; similarities in the value of the kidney indicate that the kidney was not over burdened by the inclusion of maize offal (MO) and Brewers Dried Grain (BDG) in the dietary treatments, thus, its excretory function was not impaired.

Significant difference exists in the values for liver across treatments. T₁ was significantly different ($P < 0.05$) from T₂, T₃ and T₄, respectively, however T₂, T₃ and T₄ was statistically similar ($P > 0.05$) indicating that supplementation with BDG/MO was safe for animal feeding.

CONCLUSION

The study showed that supplementation with brewers dried grain and maize offal significantly ($p < 0.05$) improved carcass cuts, visceral organs weight of west African dwarf bucks.

Recommendations

West African Dwarf (WAD) buck on treatment 3 (200% maize offal/Brewers Dried Grain) diet recorded the best values in majority of the parameters measured and is therefore recommended for growing WAD buck.

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