GROWTH PERFORMANCE OF WEST AFRICAN DWARF GOATS FED BOILED, DRIED *Gmelina arborea* AND SUNDRIED *Moringa oleifera* LEAVES

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ABSTRACT

Sixteen West African Dwarf goats weighing 5.5kg to 10.7kg were used to determine the growth performance of west African dwarf goats fed boiled dried *Gmelina arborea* leaves and sundried *Moringa oleifera* leaves. The goats were allotted randomly into four (4) treatments groups of four (4) animals each having two (2) replicates each in a completely randomized design. Goats in T1 were fed concentrate (50g) and *Panicum maximum* (50g) (control diet), T2 were fed concentrate (50g) and boiled dried *Gmelina arborea* (50g) leaves, goats in T3 were fed concentrate (50g) and sundried *Moringa oleifera* (50g) leaves while goats in T4 were fed concentrate (50g) and mixture of fresh *Gmelina arborea* (25g) and fresh *Moringa oleifera* (25g) leaves respectively. These were used to feed the animals in a completely randomize design. The Experiment lasted for 10 weeks. The animals were weighed on weekly basis. Data collected were analyzed using the one way analysis of variance (ANOVA) while the mean were separated using the Duncan multiple range test. The result from this study shows that animals in T4 fed concentrate with mixture of fresh *Gmelina arborea* leaves and fresh *Moringa oleifera* leaves performed better in respect to feed intake having a record of 2.88±0.008 followed by T1 2.80±0.012 while experimental animals in T2 and T3 had the lowest value 2.76±0.012 and 2.79±0.0119 respectively, animals in T4 gained weight while those in T1, T2 and T3 lost weight. The study suggest the use of fresh *Gmelina arborea* leaves and fresh *Moringa oleifera* leaves in feeding goats due to the fact that they are efficiently utilized by the animals and their availability even at the peak of dry season.

Keywords: West African Dwarf Goat, Performance, Fed, *Gmelina arborea*, *Moringa oleifera*.

INTRODUCTION

A major constraint to livestock production in developing countries is the scarcity and fluctuating quantity and quality of feed supply year round. Providing adequate good quality feed for livestock to raise and maintain their productivity is a major challenge to livestock farmers, agricultural scientist and policy makers all over the world. Esonu, Izukanne, Emenalom, Etuk, Inyang, Samuel, Szeoke and Mere (2006). According to Grovum (1987), the performance and productivity of a given animal is largely dependent upon the quality of feed consumed and the efficiency of digestion and metabolism. Small ruminant are one of the sources of income large enough to be used for capital investment (Akinsoyinu, 1985). They rely on pasture for their nutrition than any other feed resources (Anderinola *et al.*, 2008). This pasture (grasses) are known to be inherently poor in digestibility, nutritive value and unavailable in off-season (Babayemi *et al.*, 2009). At this period the performance of the animals is greatly affected due to poor quality of available pastures. This low quality is associated with the fibrous and lignified nature of the pastures which limit the intake, digestibility and utilization (Olafadehan *et al.*, 2009) thus there is need for ruminant nutritionist to develop feedstuff that are readily available and of little or no nutritional value to man. During the dry season, natural pasture has low nutrient content with exception of fiber content which is high (Bonsi *et al.*, 1995) thus foliage of shrubs and trees play an important role in providing fodder of better quality. It is widely recognized that browse plant constitute one of the cheapest source of feed for ruminant (Ahanefula *et al.*, 2006) this plant are important owing to their potentially good nutritive value. It is therefore essential to utilize browse plant that are highly acceptable to the ruminant since they are cheaper source of feed than the conventional pasture which often wither away during the off-season. The main objective of this study is to access the growth performance of West African Dwarf goats fed boiled dried *Gmelina arboreal*

leaves and sun dried *Moringa oleifera* leaves. To determine the proximate composition of boiled dried *Gmelina arborea* leaves and sundried *Moringa oleifera* leaves and also determine the feed intake, weight changes feed conversion ratio of West Africa Dwarf Goats fed with boiled dried *Gmelina arborea* leaves and sundried *Moringa oleifera* leaves.

MATERIALS AND METHODS

The study was carried out at the sheep and goat unit of the Teaching and Research Farm and in the Animal Science Laboratory of the Department of Animal Science, Delta State University Asaba Campus. Fresh *Gmelina arborea* leaves and *Moringa oleifera* leaves were harvested and processed as boiled dried for 3 minutes and sundried for two (2) days. The harvested *Moringa oleifera* were sun dried for 2 days. Sixteen (16) West African Dwarf Goat was purchased from a Goat farmer owned by Mrs. Florence Ochei, They were treated with Ivermectin injection against internal and external parasites (subcutaneously). Oxytetracycline (long acting antibiotics) and multi vitamins (intramuscularly) were also administered. The experimental design was a complete randomized design whereby 16 West Africa Dwarf Goat were allotted randomly into four (4) treatments group of 4 animals each. Each replicates had 2 goats thereby giving a total of 4 goats per treatment group. The experimental diets are **T1**: concentrate (50g) + *Panicum maximum* (50g) (control diet), **T2:** Concentrate (50g) + boiled dried *Gmelina arborea* leaves (50g), **T3:** concentrate (50g) + sundried *Moringa oleifera* leaves (50g), **T4:** concentrate (50g) + mixture of fresh *Gmelina* arborea (25g) leaves and *Monriga oleifera* (25g) leaves. The proximate analysis of experimental diets were analysed according to standard method of A.O.A.C (1990). The pens were thoroughly cleaned and disinfected before the arrival of the animals and the animals were allowed seven(7) days of acclimatization period before the commencement of the experiment. Daily feed intake was calculated by weighing the daily concentrate and the processed diets and subtracting it from the quantity fed to the animal, and the experimental animals were weighed weekly to evaluate their body gains. Feed conversion ratio was also calculated. Data obtained were statistically analyzed using analysis of variance (ANOVA). Effect of treatment and significant means were separated by Duncan multiple range test (Duncan, 1955).

RESULT AND DISCUSSION

The result of the proximate analysis of the experimental diet is shown in Table 1. The value Dry matter value ranged from 88.00 to 93.14%, this observation were similar to the DM value of 90.50% and 85.71% for some selected browse plants in southern Nigeria reported by Oduozo and Adegbola (1992) and Okoli *et al.* (2003) respectively, but higher than the DM values of 62.75% and 77.71% recorded by Fajemisin *et al.* (2015). The crude protein (CP) values ranged from 17.20 to 24.20 and this observation was adequate to support the growth performance West African Dwarf Goat being a small ruminant animal and the values is well above the critical level of 7% crude protein required by small ruminants for maintenance. Moreover, these values were comparable with 15.75 to 17.41% CP for concentrate supplements at WAD goats fed diets containing sweet orange peel meal (Oloche *et al.*, 2015). Ether Extract (EE) values ranged from 2.88 – 14.93%, this value being adequate, as higher value of EE will leads to quick spoilage of animal feed as a result of rancidity. Arigbede *et al.* (2011) reported similar EE values of 2.92 – 6.68% for concentrate diet containing *Enterolobium cyclocarpum* seeds for WAD sheep. Nitrogen free extract values were 48.94%, 53.24%, 48.01%, 47.97%, 43.54% and 51.33% respectively, this value is an indication that there was appreciable fermentable carbohydrate for energy production. Observed values in this recent study were higher than 26.97% -31.02% NFE reported by Maigandi and Abubakar (2004) for red sokoto goats fed varying levels of *faidherbia albida pods*. Esugbohungbe and Odunyemi (2002) reported 52.10 – 59.81% NFE for goats fed *Terminalia catappa* and *calypha wilkesiana* leaves. Ash values were between 2.5 to 5.9%. These values suggest that there were enough minerals supply to the animals. The result on the performance of WAD goats fed the experimental diets is shown in Table 2.1. the results of the treatments significantly influenced ($P<0.05$) the feed intake and final weight gain. There were significant increases in feed intake and weight gain in the

experimental diets. Values for the animals fed control diet (T1) compared ($P>0.05$) with those of T2 and T3, but however differed ($P<0.05$) significantly from that group fed T4 diet. Goats that received T4 diet had highest average daily gain of 0.05g/d. The final weights ranged from 5.60±0.81 to 9.83±0.31 while the average daily weight gain were between -1.31±0.73, -0.05±0.016 . This observation suggests that the treatments diets can also help WAD goat production. The observed values were comparable with 6.85 – 20.54g for WAD goats fed diets containing SOPN (Oloche *et al.*, 2015). There were similar values in feed intake from 2.76±0.012 to 2.88±0.008. This suggests that treatments diets were palatable and also accepted by the experimental animals. This study were comparable with 291.55g – 313.42g/day reported for WAD goats fed cassava peel – cassava leaf meal based diet (Ukanwoko *et al.*, 2009).

CONCLUSION AND RECOMMENDATION

The result of this study shows that animals fed T4 diet i.e. fresh *Gmelina arborea* leaves and fresh *Moringa oleifera* leaves performed better with respect to feed intake and weight gain than those fed experimental diet in T1, T2 and T3. Since *Gmelina arborea* is known for its production of appreciable amount of leaves even at the peak of dry season and *Moringa oleifera* known to be fast growing, nutritious and drought resistant. They can reliably be used for goat feeding as supplement to conventional pastures which often wither away during the off season. This will help improve the socio economic well-being of ruminant animal procedures, reduce the cost of production and result in increased ruminant production, thereby making meat (a source of protein) available to Nigeria populace at a reduced price.

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Proximate Composition of Experimental Diet

Parameters	B.D G.A	F. G.A	S.D M.O	F.M.O	P.M	Concentrate
DM	90.20	88.18	91.59	90.10	88.00	93.14
CP	22.44	17.20	23.49	24.20	10.14	18.44
CF	11.44	4.40	5.00	4.98	9.27	5.94
EE	2.88	9.36	11.39	9.45	13.43	14.93
AC	4.50	3.92	4.00	3.50	5.94	2.5
N.F.E	48.94	53.24	48.01	47.97	43.54	51.33

B.D.G.A - Boiled Dried *Gmelina arborea,* F.G.A - Fresh Gmelina arborea, F.M.O - Fresh *Moringa oleifera,* S.D.M.O - Sundried *Moringa oleifera,* P.M - *Panicum maximum,* D.M – Dry matter, A.C - Ash content, E.E - Ether extract, C.F - Crude fiber, N.F.E - Nitrogen free extract

Performance of West African dwarf goats fed boiled dried *Gmelina arborea* leaves and sundried *Moringa oleifera* leaves.

PARAMETERS	T1	T2	T3	T4
Initial weight (kg)	7.63 ± 0.0688^{b}	7.65 ± 0.540^{b}	7.00 ± 0.646^{a}	8.55 ± 0.782^{d}
Final weight (kg)	5.60 ± 0.807^{a}	5.98 ± 0.409^{a}	6.20 ± 0.784^{c}	9.83 ± 0.312^{d}
Weight change	-2.03 ± 0.184^{c}	-2.53 ± 0.184^{a}	-2.40 ± 0.156^{b}	2.83 ± 0.350^{d}
Average daily weight gain	-0.67 ± 0.637^{b}	-1.31 ± 0.732^{a}	-1.04 ± 0.003^{c}	0.05 ± 0.006^{d}
Feed intake (kg)	2.80 ± 0.008^{a}	2.76 ± 0.0119^{b}	2.79 ± 0.012^{c}	2.88 ± 0.008^{d}
Average feed intake	5.72 ± 0.034^{b}	5.73 ± 0.0065^{b}	5.75 ± 0.015^{a}	5.76 ± 0.016^{a}
Feed conversion ratio	1.49 ± 0.047^{c}	1.64 ± 0.067^{d}	1.28 ± 0.042^{b}	1.18 ± 0.040^{a}

Note: means within the row with different superscript are significantly different ($P\leq0.05$)