INFLUENCE OF CASSAVA FOLIAGE SUPPLEMENTATION ON THE PERFORMANCE OF WEST AFRICAN DWARF SHEEP FED GROUNDNUT HAULMS

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Abstract

The performance of sixteen (16) West African dwarf sheep (WAD) with average body weight of 13.20 ± 0.34kg were evaluated in a complete randomized design to determine the effect of varying inclusion levels of cassava foliage (CFL) at 0, 10, 20 and 30% in groundnut haulms (GH) based diets. Results showed that CFL supplementation of GH had a positive effect (P<0.05) on dry matter (DM) intake of GH and weight gain of sheep. Among the supplemented treatments, sheep fed 20% CFL showed better DM intake (455.74g/day), weight gain (45.24g/day) and feed conversion ratio (9.96) with sheep on sole GH diet having reduced (P<0.05) weights of 27.74 g/day. Digestibility values for dry matter and crude protein increased (P<0.05) with an increase with the inclusion levels of CFL in the diets but similar values observed in 20 and 30% CFL diets. It was however concluded that supplementing groundnut haulms with 20% inclusion levels of cassava foliage improved feed intake, digestibility, and weight gain in WAD sheep.

Keywords: Sheep, cassava foliage, groundnut haulms, intake, weight gain, digestibility

Introduction

Sheep production in Nigeria is a growing enterprise among smallholder livestock farmers that combine sheep husbandry with other agricultural and non-agricultural activities. The production of sheep is however limited among other factors by inadequacy of year round feed availability, mainly because of the direct competition with man and industries for the same resources. Crop residues are alternative and strategic cheap source of feed for ruminants (Elginaid *et al.*, 1997), though its utilization is often limited by low nutrient levels and poor digestibility. Hence, the need for the introduction of adequate supplementary nitrogen in the diets of ruminants to assist the rumen microbes to obtain maximal rate of digestion of carbohydrate diet as well as high microbial protein synthesis (Madsen and Hvelplund, 1988). Groundnut haulms are the major residue obtained after groundnut harvesting and have been used as excellent feed with palatable quality especially when harvested as soon as it reaches full seed production (Ayantunde *et al.*, 2007). Cassava foliage on the other hand, which in most cases classified as wastes after tuber harvest has been found to be readily available and excellent feed for ruminants, serving as a good source of supplemental nitrogen in ruminant diets (Oni *et al.*, 2011; Fasae *et al.*, 2012). This study therefore investigates into the potential of varying inclusion levels of cassava foliage supplementation on the performance of West African dwarf sheep fed groundnut haulms.

Materials and methods

The experiment was carried out at the Directorate of University farms, Federal University of Agriculture, Abeokuta, Ogun state, Nigeria. Sixteen (16) West African dwarf sheep aged 9 to 12months were purchased from smallholder farmers in Abeokuta, Ogun-State. They were quarantined for 30days, vaccinated against endo and ecto parasites, tagged and housed in individual pens. Bags of groundnut haulms (GH) were purchased from nearby Hausa markets in Kotopo, Abeokuta and the cassava foliage (CFL) sourced from harvested cassava farms within the University campus, chopped (to about 40-50cm) and sundried before feeding it to the animals. The animals were randomly allotted to 4 dietary treatments namely: 0, 10, 20 and 30% CFL inclusion in groundnut haulms based diets, for treatments 1 to 4, respectively. The animals were supplied basal diet of fresh leaves of *Panicum maximum ad-libitum*. The feeding was carried out twice every day by 8am and 1pm, respectively with constant supply of fresh water.

Feed intake was recorded throughout the 90day experimental period and weight changes observed on each animal on weekly basis. Animals were transferred into metabolic cages for the digestibility trial at the last 14days of the experiment, involving 7 days of adaptation to the cages and 7 days faecal collection. Feed and faecal samples collected were analyzed for proximate analysis (AOAC, 1990). Data obtained were subjected to one way analysis of variance in a completely randomized design using the statistical

package (SAS, 1999). Significant treatment means were compared using the Duncan multiple range test of the same package (Duncan, 1955).

Results and discussion

The dry matter content (Table 1) of the experiment diets is similar across the treatments. The crude protein content of the diet increased with an increase in the inclusion of the cassava foliage in the diets and ranged from 10.73 – 13.97% and with least percentage observed in diets containing 0% CFL. However, these values are above the minimum of 11% dietary crude protein needed for maintenance in most sheep (Devendra and Mcleroy, 1982) The crude fibre and the ether extract in treatment 2 (10% CFL) has the highest percentage value but, with a low ash content of 10.73%. The feed intake observed across the dietary treatments differed ($P<0.05$) without any definite pattern. The low feed intake observed in sheep fed the control diet could be as a result of the low crude protein content and palatability of the diet. This agrees with the fact that low protein content diets depress animal intake (Ifut, 1988). Also, the decrease in total feed intake in this treatment suggests that the unsupplemented groundnut haulms diet is not as palatable compared to the cassava foliage supplemented treatments probably due to its high fibre content (Obioha, 1985). However, the slight decrease in feed intake observed in sheep fed 30% CFL may be due to excess level of cyanide in the rumen ecosystem. Meyrelles *et al* (1977) observed similar result in which animal responses to utilization of cassava foliage as protein roughage supplement to sugarcane-based diet was positive but low thereby contributing to poor animal performance. No evidence in this study was provided to implicate HCN toxicity. The highest feed intake observed in sheep fed 20% CFL diet may be attributed to optimal level of cassava inclusion in the diet which could have promoted by-pass protein and maintain low anti-nutritional factor present in the diet. Mpairwe *et al*, (2003) also observed that providing supplements with adequate crude protein to ruminants has promoted dry matter intake, rumen degradation and nutrient flow to small intestine and culminated in higher animal performance.

The weight gain (g/day) of 27.74 to 45.24 g/day obtained across dietary treatments differed significantly ($P<0.05$) with highest weight gain was observed in sheep fed with 20% CFL, and the least value observed in sheep fed 0%CFL. These values are however falls within 39.2 to 69.3 g/day reported by Alli-ballogun (1995) in sheep fed cassava foliage and groundnut haulms as protein supplements fed basal diet of Gamba grass. The best feed conversion ratio of 9.96 was observed in animals on 20% CFL supplementation, though not different from other CFL supplemented treatments and worst (11.19) in sheep fed 0% CFL. This suggests the efficient utilization of CFL supplementation of groundnut haulms. High digestibility obtained for the nutrients in all diet suggest high utilization of the feed by the animals which corroborates with the findings of Ahamefule *et al*. (2010) in bucks of West African Dwarf goats fed cassava leaf and maize offal based diets. The digestibility of dry matter and crude protein increased with an increase with the inclusion levels of CFL in the diets, supporting the reports of Ososanya, (2012) who observed increase in digestibilities of these nutrients as *Cynodon nlemfuensis* hay was replaced with groundnut haulms in diets of *rams*. The dry matter digested did not vary significantly ($P>0.05$) across the CFL supplemented treatments. DM digestibility ranged from 53.09% (0%CFL) to 67.54% (30% CFL) and crude protein digestibility (CPD) increases with the inclusion of CFL in GH diets. CP digestibility were similar ($P>0.05$) and better in 20% and 30% CFL diets compared to the other treatments. The CPD value ranges between 54.04% (0% CFL) to 64.26% (30% CFL) and are comparable to that obtained by Fadel Elseed *et al.* (2012) and Fasae *et al.* (2012) in sheep fed groundnut haulms and cassava forage diets, respectively.

Conclusion

This experiment revealed that supplementing groundnut haulms at 20% inclusion levels of cassava foliage improves feed intake, digestibility, and weight gain of sheep. This can serve as a feedstuff for sheep during period of forage scarcity or unavailability of conventional feeds or forages.

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Table 1: Chemical composition (%) of experimental diets

Composition	0% CFL	10% CFL	20% CFL	30% CFL	CFL
Dry matter	95.38	95.50	95.88	96.00	95.21
Crude protein	10.73	11.17	13.58	13.97	18.17
Crude fibre	21.49	18.48	16.31	14.44	10.04
Ether extract	10.51	13.83	10.50	10.25	15.22
Ash	13.25	10.63	10.73	11.25	5.90

CFL: cassava foliage

Table 2: Performance indices, nutrient digestibility of groundnut haulms supplemented with varying levels of cassava foliage in West African dwarf sheep.

Parameters	0% CFL	10% CFL	20% CFL	30% CFL	SEM
Initial weight (kg)	13.17	12.90	13.50	13.33	0.35
Final weight (kg)	15.50	15.90	17.30	16.57	0.57
Weight gain (kg)	2.33^{c}	3.00^{b}	3.80^{a}	3.23^{b}	0.16
Daily weight gain (g/day)	27.74^{c}	35.71^{b}	45.24^{a}	38.45^{b}	2.91
Feed intake (g/day)	307.53^{c}	367.93^{b}	455.74^{a}	385.63^{ab}	45.79
Feed conversion ratio	11.0^{b}	10.30^{b}	9.96^{b}	10.02^{b}	0.29
Nutrient Digestibility					
Dry matter	53.09^{b}	66.10^{a}	67.61^{a}	67.54^{a}	1.75
Crude protein	54.04^{b}	55.36^{b}	63.36^{a}	64.26^{a}	1.17

^{a,b,c} *means with different superscript on the same row are significantly different ($P<0.05$).*

CFL: cassava foliage.