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EFFECT OF INTERVAL OF FEEDING ROUGHAGE AND CONCENTRATE ON THE PERFORMANCE OF SOKOTO RED BUCKLINGS

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ABSTRACT

The effect of interval of feeding roughage and concentrate on the performance of Sokoto Red bucklings was evaluated in this study, which was conducted at Federal University Dutsin-Ma Livestock Teaching and Research Farm.Fifteen (15) Sokoto Red bucklings with average body weight of 10.5 kg were allotted to three treatments in a Completely Randomized Design (CRD). The treatments are Treatment 1: roughage and concentrate fed at 0 h interval; Treatment 2: roughage and concentrate fed at 2 hours interval and Treatments 3: roughage and concentrate fed at 3 hours interval. The Groundnut haulms and concentrate were fed at a ratio of 70% to 30%, respectively. Water was offered *ad libitum* and changed every morning. Changing the Interval of feeding Concentrate and roughage did not affect concentrate and hay intake significantly ($P > 0.05$). The total weight gain and average daily gain (ADG) of the experimental animals were not significantly ($P > 0.05$) affected by the feeding interval. Based on the data obtained, it is concluded that the interval of feeding concentrate and roughage did not affect the performance of the Sokoto Red bucklings. It is therefore recommended that the farmers should offer both the concentrate and roughage at 0 h interval.

Keywords: interval, concentrate, roughage, buckling, performance

INTRODUCTION

More than 95% of the rural households in Nigeria do keep goats (Ukpabi 2000). This shows that goats constitute a very important integral part of rural economy. Because of its low-cost of maintenance, short-term return on capital with low risk on capital investment, goat is ideally suitable for poorer rural folk especially for marginal and landless people. However, despite all these good attributes of goats, its production and productivity are being hindered by inadequate nutrition occasioned by the prevalence of poor quality roughages especially during the dry season, constituting a nutritional challenge to goat production enterprise (Shellepe and Daniyel, 2017). Aruwayo *et al.* (2016) reported that the productivity of the ruminants in the

North Western Nigeria has been adjudged to be low and that one of the reasons for this phenomenon is the supply of feed which fluctuates as a result of vagaries of weather condition. This challenge of shortage of feed scarcity is further worsened by poor utilization of the available feedstuff. One of the ways the researchers try to manipulate and improve nutrient utilization by livestock is by evaluating the sequence and interval of feeding roughage and concentrate on the performance of livestock. Adeleke (2015) reported that feeding roughage and concentrate to Yankasa rams at 2 h intervals irrespective of the sequence of feeding produced better performance. However, he recommended further study of wider intervals, therefore the need for the present study. The study aimed at evaluating the effect of interval of feeding roughage and concentrate on the performance of Sokoto Red buckling.

MATERIALS AND METHOD

Location of the Experiment

The experiment was conducted at Federal University Dutsin-Ma Livestock Teaching and Research Farm located in Sudan Savannah ecological zone. The area lies between latitude 12°2718N and longitude 7° 29'29'E, and 605 meters above sea level. The area receives an annual rainfall of 700mm which is spread from May to September. The mean annual temperature ranges from 29° – 31°C. The highest air temperature normally occurs in April/May

and the lowest in December through February. Evapo-transpiration is generally high throughout the year. The highest amount of evaporation occurs during the dry season. The vegetation of the area is the Sudan Savannah type which combines the characteristics and species of both Guinea and Sahel Savannah (Abaje, 2007, Tukur *et al*., 2013).

Animals and Experimental Design

Fifteen (15) Sokoto Red bucklings (5-6 months old) with average weight of 10.5 kg were used in a Completely Randomized Design (CRD)to evaluate the effect of interval of feeding roughage and concentrate on performance of Sokoto Red bucklings. The trial involvedthree treatments (Treatment 1: roughage and concentrate fed at 0 h interval; Treatment 2: roughage and concentrate fed at 2 hours interval and Treatments 3: roughage and concentrate fed at 3 hours interval). The hay and concentrate were fed at a ratio of 70% to 30%, respectively. Water was offered *ad libitum* and changed every morning. The animals were sourced from Dutsin-Ma Wednesday market in Dutsin-Ma Local Government Area of Katsina State. They were quarantined for two weeks during which they were fed the experimental diets for adaptation, and dewormed with Albendazole. At the end of the adaptation period, they were tagged and weighed to get their initial weights before being randomly allocated to the three treatments.

Experimental Diets and Management of Animals

The experimental diets include roughage (groundnut haulms) and concentrate mixture compounded to contain 15% CP. The concentrate mixture composed of maize offal, cottonseed cake, bone meal and common salt (Table 1). The bucklings were quarantined before the commencement of the trial. They were weighed at the beginning of the study and subsequently every week during the course of the trial. They were housed in individual pens and the diets were offered to the animals in the morning and leftovers were collected and weighed the next day. The hay and concentrate were fed at a ratio of 70% to 30% respectively. A total of 4% of body weight was fed to each animal. Water was offered *ad libitum* and changed every morning.

RESULTS AND DISCUSSION

The ingredients composition of the concentrate and roughage diet is presented in Table 1. Table 2 shows the chemical composition and metabolizable energy (ME) content of hay and the concentrate supplement used in this study.

Table 1: Ingredient composition of concentrate supplement and the roughage {%}

Concentrate	Composition	Roughages	Composition
Maize offal	67.85	Groundnut haulms	100
Cotton seed cake	30.15		
Bone meal	1.50		
Common salt	0.50		
Total	**100.00**		**100**

Table 2: Chemical composition and energy content of the experimental feed

Parameters	Concentrate (%)	Groundnut haulms (%)
Dry matter	87.18	87.81
Crude protein	9.5	15.06
Ether extract	17.45	9.87
Nitrogen free extract	52.69	68.92

Crude fibre	5.74	24.84
Acid detergent fibre	11.21	26.07
Neutral detergent fibre	14.28	37.47
Ash	7.18	6.97
Metabolizable energy (MJ/kg DM)	11.34	10.78

ME (MJ/kg DM) = 11.78 + 0.00654CP + $(0.000665EE)^2$ – CF(0.00414EE) – 0.0118A where CP = Crude Protein, EE = Ether Extract, CF = Crude Fibre, A = Ash (, 1985).

Table 3: Feed intake of Sokoto Red bucklings as affected by interval of feeding roughage and concentrate

Parameters	Treatment 1	Treatment 2	Treatment 3	SEM
Feed intake(g/d)				
Groundnut haulms	130.46	124.99	100.69	8.41^{NS}
Concentrate	65.10	62.25	49.28	4.10^{NS}
Total DMI	195.55	187.24	149.98	12.23^{NS}
DMI as %BW	1.96	1.70	1.31	0.14^{NS}
DMI /kg$W^{0.75}$	34.74	30.90	24.11	2.32^{NS}

BW=body weight, NS=not significant (P > 0.05), SEM=standard error of the means, DMI=dry matter intake

Changing the interval of feeding concentrate and hay (Groundnut haulms) did not affect concentrate and hay intake significantly (P > 0.05). Bucklings fed roughage and concentrate at 0 hour interval tends to have numerical increase of feed intake for concentrate and hay, 65.10 g/d and 130.46 g/d, respectively when

compared with those fed roughage then concentrate at 2 and 3 hours intervals. The differences in DMI (Table 3) among the three treatments were also not significant (P > 0.05). This suggests that the supply of nitrogen and energy were similar in all the three treatments. An increase in total DMI has been reported to be associated with improved N and energy supply to cellulolytic bacteria, leading to increased degradation of roughage, and to a higher digesta passage rate (Goodchild and McMeniman, 1994; Chakeredza et al., 2002). These results disagree with that of Adeleke (2015) who reported significance effect of interval on feed intake of concentrate, roughage and total DMI although the author compared between 1 h and 2 h intervals.

Table 4: Live-weight change and feed efficiency of growing Sokoto Red kids as affected by interval of feeding roughage and concentrate

Parameters	Treatment 1	Treatment 2	Treatment 3	SEM
Live weight(kg)				
Initial	11.50	11.00	10.17	0.42^{NS}
Final	12.00	11.83	11.33	0.36^{NS}
Weight change	1.83	0.83	-0.17	0.45^{NS}

ADG(g/d)	32.70	14.90	-3.00	0.01 NS
FE (g gain/kg of feed)	40.22	19.70	-30.63	9.76

ADG=average daily weight gain, FE=feed efficiency, NS=not significant (P > 0.05), SEM=standard error of the means

The effects of the interval of feeding roughage and concentrate on the final weight change, ADG and feed efficiency were not significant (P > 0.05). Although the differences were not significant the performances of the bucklings followed a trend; as the interval of feeding increases the performance nosedives with the bucklings in treatment 3 exhibiting negative results. This makes feeding of concentrate and supplement at 3 h interval not advisable.

CONCLUSION

Based on the results of this study, it is concluded that the interval of feeding concentrate and roughage did not affect the feed intake and weight gain of the Sokoto Red bucklings. It is therefore recommended that the farmers should offer both the concentrate and roughage at the same time or as most convenient though feeding at 3 h interval is strongly discouraged as it gives negative results.

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