American-Eurasian Journal of Agronomy 1 (1): 16-18, 2008
ISSN 1995-896X

Effects of Supplementing Sorghum Stover with Poultry Litter on Performance of Wadara Cattle

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Abstract: A study was carried out to investigate the effects of poultry litter supplementation on feed intake, Dry Matter Digestibility, (DMD) and Liveweight Change (LWC) of growing Wadara cattle. Fifteen Wadara cattle aged 18-24 months weighing 115 kg±9.9 were used in this study. Supplementation with poultry litter significantly ($p<0.05$) increased dry matter intake (DMI) 1.14, 1.92 and 2.66 kg day^{-1} for T_1, T_2 and T_3, respectively. Digestibilities of DM, CP and OM were significantly ($p<0.05$) increased following supplementation, DM, CP, OM, but level of supplementation does not significantly ($p<0.05$) affect ADF and NDF. Animals fed on sorghum stover alone (T_1) lost weight (-5.0 kg), While those on T_2 and T_3 gain weight 2.5 and 5.5 kg, respectively. From the result of this study, supplementation with poultry litter improves the performance of Wadara cattle fed on sorghum stover basal diet.

Key words: Poultry litter · wadara cattle · sorghum stover

INTRODUCTION

During the long dry season, the feed foreseen available for ruminant livestock feeding are mainly crop residues. It is estimated that more than 40 percent of the dry season grazing time is spent by cattle on crop residues [1]. The main nutritional constituent of the use of crop residues as animal livestock feed is slow rate of digestion, due to high lignin and silica and relatively poor nutrient content [2].

Adegbola *et al.* [3] reported that increasing case of conventional protein of plant origin such as cotton seed cake, groundnut cake and palm kernel meal has led to intensive use of unconventional feed resources non-protein nitrogen. Poultry litter has been used in experiments with growing heifers, lactating ewe and goats and fattening calves to replace up to 30 percent of conventional concentrate feed [4, 5].

Present experiment was undertaken to study the effect of feeding sole poultry litter on nutrient intake and utilization by Wadara cattle.

MATERIALS AND METHODS

Fifteen Wadara cattle aged between 18-24 months with mean liveweight of 115±9.9 kg were used for this study. The experimental animals were randomly assigned into three treatment groups with five animals per group in a complete randomized design and assigned to one of the treatments of level of supplementation as 0 kg (T_1), 0.5 kg (T_2) and 1.0 kg (T_3) of poultry litter. The experiment lasted for 90 days.

Poultry litter was sun-dried for 3 days to minimize the level of microbes present, while the Sorghum stover was obtained immediately after the grain harvest and chopped to 3-5 cm before feeding.

Prior to the commencement of the experiment, the animals were routinely dewormed and sprayed against ecto-parasites. The supplement was offered once in the morning and the basal diet (Sorghum stover) was offered immediately after the feeding of supplements and in the evening. Water and mineral salt lick were offered ad libitum throughout the experimental period.

All data collected during the experiment was subjected to the Analysis Of Variance (ANOVA) procedure and the means were statistically tested for significance by using methods described by SAS [6].

Proximate analysis was conducted to determine dry matter, crude protein, crude fibre of feed and feces using the AOAC [7] procedure and Acid Detergent Fibre (ADF) and Neutral Detergent Fibre (NDF) were determined using Goering and Van Soert [8] procedure.

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RESULTS AND DISCUSSION

The chemical composition of the supplement and the basal diet are presented in Table 1. They all have a high dry matter content ranging from 92 percent in Sorghum stover to 95 percent in poultry litter.

The poultry litter used in this experiment has a crude protein of 28.2 percent higher than 17.0 and 16.01 percent reported by Odhuba *et al*. [9] and Taiwo *et al*. [10], respectively, but within the range of 14.3-30.0 percent reported by Bhattacharya and Taylor [4]. The variations in the CP values of the poultry litter may be attributed to type of birds kept, the age of the litter and the level of feeding of the birds.

The CP values of the Sorghum stover is low 3.3 percent, this is inline with the results reported by Alhassan [2] and Olayiwole and Olorunju [11]. This lower value in Sorghum stover CP justifies the need for supplementation.

The high ADF and NDF reported for both the poultry litter and the sorghum stover, this should be expected because of the litter material and the lignification of the sorghum stover as it matures at harvest.

Table 2 shows the total dry matter intake. Supplementation had significantly ($p<0.05$) affected total dry mater intake of the basal diet. Increasing the level of supplementation also significantly ($p<0.05$) increases the dry matter intake from 1.92 to 2.06 kg day^{-1}.

Animals in treatment 1 consumed less stover 1.14 kg day^{-1} this is in line with the findings of Reid and Klopfenstein [12], which showed that feeds with low CP content are seldom consumed by animals.

Animals fed on the supplement gain weight. While those unsupplemented loss weight. Level of supplementation significantly ($p<0.05$) result in higher liveweight gain -55.5, 27.77 and 61.11 g day^{-1} for treatments 1, 2 and 3, respectively. The relatively high liveweight gain of the animals in treatment 3 fed 1.0 kg of poultry litter could be due to the ability of the supplement to supply necessary nutrients (especially fermentable N) in ensuring optimum microbial biomass. This agrees with earlier report by Orskov [13] and Leng [14] that adequate nutrients in feeds taken in by ruminants for the rumen microbes would stimulate optimal production in nutrient livestock.

The loss in weight of animals in treatment 1 fed sorghum stover alone is consistent with the report of Otchere *et al*. [15] that animal which receives no supplementation in the dry season lost their body weight. Catabolism of body tissues is employed to supply the much-needed nutrients for vital activities in the body [16].

Table 1: Chemical composition of experimental feeds (%)

	Sorghum stover	Poultry litter
Dry matter	92.0	95.0
Organic matter		
Ash	9.5	15.3
Crude protein	3.3	28.2
ADF	46.9	30.29
NDF	57.2	38.62

ADF: Acid Detergent Fibre, NDF: Neutral Detergent Fibre

Table 2: Mean lifeweight change, dry matter intake and feed conversion efficiency of Wadara cattle fed sorghum stover supplemented with poultry litter

	Level of supplementation			
Parameters	0	0.5	1.0	SEM
Dry matter intake				
Sorghum stover	1.14	1.42	1.66	0.26
Poultry litter	-	0.50	1.00	0.25
Total DMI Kg/day	1.14	1.92	2.66	1.95
Lifeweight change (kg)				
Initial	135.00	120.00	110.00	
Final	130.00	1225.00	115.50	
Gain	-5.00	2.50	5.50	
ADG (g)	55.50	27.77	61.11	

ADG: Average Daily Gain

Table 3: Apparent nutrient digestibility in wadara cattle fed sorghum stover diet supplemented with poultry litter.

	Level of supplementation		
Parameters	0	0.5	1.0
Dry matter	31.42^{c}	41.59^{b}	54.09^{a}
Crude protein	30.40^{c}	40.70^{b}	48.50^{a}
Organic matter	32.60^{c}	45.70^{b}	57.30^{a}
ADF	40.20^{b}	48.50^{a}	51.60^{a}
NDF	43.05^{b}	49.30^{a}	52.80^{a}

a,b mean with different superscript differ significantly ($p<0.05$)

The result of nutrient digestibility is shown in Table 3. Supplementation generally significantly ($p<0.05$) affects Dry Matter (DM), crude protein and Organic Matter (OM) digestibility and also the level of supplementation affect the digestibility of DM, OM and CP.

There is also a significant difference ($p<0.05$) in the digestibility of ADF and NDF due to supplementation, while level of supplementation does not significantly ($p>0.05$) affect ADF and NDF digestibility. The low

digestibility reported in this study was in close agreement to that reported by Dolberge *et al*. [17] that generally feeds high in crude fibre have low digestibility. Supplementation with poultry litter increased the digestibility of the sorghum stover. This is consistent with the findings of Orskov [13] who showed that supplementation with poultry litter enhances the digestibility of poor quality crop residue by supplying needed ammonia required by the rumen microbes.

CONCLUSIONS

It is apparent that supplementation of poor quality crop residues with poultry litter enhances intake and digestibility of the basal diet which is the major feed resource during the long dry season. Liveweight gains by Wadara cattle on this diet can further be improved by feeding energy source in addition to meet the P: E ration.

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