EFFECTS OF SUPPLEMENTING SUN-DRIED POULTRY DROPPINGS ON NITROGEN BALANCE OF GROWING YANKASA RAMS FED SORGHUM STOVER BASAL DIET

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ABSTRACT
This study was conducted using fifteen growing Yankasa rams with an average weight of 13.5kg in a completely randomised design (CRD) to study the effects of feeding sun-dried poultry droppings on nitrogen balance on growing Yankasa rams. The animals are randomly allotted to five treatment groups namely treatment T_1, T_2, T_3, T4, and T_5 each consisting of three replicates with one animal per replicate The animals were fed Sorghum Stover supplemented with sun-dried poultry droppings (SDPD) such that the animals were fed 0%, 20%, 40%, 60%, and 80%, SDPD for treatments T_1, T_2, T_3, T4, and T_5 respectively. Results indicated that Positive nitrogen balance was observed across the treatment groups. Nitrogen intake was significantly higher ($P<0.05$) with increasing level of SDPD in the diets. Similar trend was observed for Nitrogen retention. However, there was no significant difference ($P>0.05$) in urinary N output between treatment T_2 and T_3. But treatment T_2 and T_3 had significantly ($P<0.05$) higher values than treatment T_1, T_4 and T_5 respectively. It was concluded that sun-dried poultry droppings included in the diets of growing Yankasa rams up to 80% improves Nitrogen intake, nitrogen balance and retention.
Keywords*:* Nitrogen balance; Sundried poultry droppings; Sorghum Stover; Yankasa Rams

INTRODUCTION
The problem of insufficiency of protein in diets of ruminant animals can be corrected with the use of readily available non-conventional agricultural waste of animal origin such as poultry droppings. Poultry droppings are wastes from poultry production enterprise which usually pose environmental and health risks as a result of improper disposal channels. The proximate composition of poultry droppings, particularly the high nitrogen content (Adegbola *et al.*, 2010) is a pointer to the fact that nutrients in the waste can be converted into animal products for Man's consumption. Therefore, it is a worthy feed for ruminant animals. It has been documented that poultry droppings can be used as protein supplement as well as sole protein source. It can support both maintenance and production needs of ruminant animals especially when fed with appropriate energy source. In addition, its utilization is a cost-saving mechanism in terms of feeds as well as waste disposal (Abdul *et al.*, 2008; Bello and Tsado, 2014).There is little information on the effects of feeding sun-dried poultry dropping on the nitrogen balance on growing Yankasa rams. This study was carried out to find out the effect of feeding sun-dried poultry droppings- based diet on nitrogen balance of growing Yankasa rams consuming Sorghum Stover.

MATERIALS AND METHODS
The study was carried out at the Animal Production Department Research Teaching Farm, Small Ruminant unit of the School of Agriculture and Agricultural Technology, Federal University of Technology, Minna, Nigeria. Fifteen Yankasa rams of less than 12 Months old with mean weight of 13.5kg were used for the study. The animals were divided into five treatment groups. The animals were treated against ectoparasites, dewormed against endoparasites and were administered with broad antibiotic to prevent bacterial infections. The rams were fed sun-dried poultry dropping maize bran blended ration. Treatment one (T_1) was 0 % sun-dried poultry droppings (SDPD), T_2 was 20 % (SDPD), T_3 was 40 % (SDPD), T_4 was 60 % (SDPD) and T_5 was 80 % (SDPD). Feeds were offered twice daily at 8.00 and 16.00 hours. Fresh clean water was also offered daily to the animals *ad libitum*. The experimental animals were fed supplemental diet at 3% body weight (BW) and Chopped Sorghum Stover (2cm long) were fed to the animals as basal diets at 2% (BW) on dry matter basis respectively. The proximate composition of experimental feed ingredients and supplementary diets

and nutrient constituents are shown in Tables 1 and 2 respectively. Nitrogen content of feed; faeces and urine were determined by the Kjeldahl method (AOAC, 1990). Nitrogen retained by the animals was calculated as the difference between nitrogen intake and nitrogen excreted, N retained = N intake – (Faecal N + Urinary N) (Sebata *et al.,* 2005; Olorunnisomo, *et al.,* 2010). All data generated were subjected to analysis of variance (ANOVA) using the General Linear Model (GLM) procedure of SAS (2008). Means were separated Using Least Significant Difference (LSD) test of the same package

Table 1: Proximate composition of experimental feed ingredients

Parameters	Sorghum Stover	Maize Bran	Dried Poultry Droppings
Dry matter (%)	94.09	84.20	93.00
Crude protein (%)	3.50	7.00	21.88
Crude fibre (%)	31.20	3.20	20.67
Ash (%)	3.90	5.50	33.00
Ether extract (%)	1.11	5.00	3.30
Nitrogen free extract (%)	54.39	63.50	14.15
Gross E (Kcal/g)	2.02	3.90	2.65

RESULT AND DISCUSSION

Nitrogen Balance

Results indicated that there were significant differences ($P<0.05$) in N intake, between Treatment T_5 and T_1, Treatment T_5 and T_4 as well as Treatment T_3 and T_2. Faecal N output followed similar trend as N intake. However, there was no significant difference ($P>0.05$) in urinary N output between Treatment T_2 and T_3. But Treatment T_2 and T_3 had significantly ($P<0.05$) higher values than Treatment T_1, T_4 and T_5 in that order. For retained N, Treatment T_5 was observed to have significantly ($P<0.05$) higher values compared to other treatments. Percent N retained followed a similar trend with N retained ($P<0.05$) (Table 3).

Table 2: Proximate Composition (% DM Basis) of Supplementary Diets fed to Yankasa Rams

Composition	Treatments (% SDPD inclusion levels)				
	T_1(0)	T_2(20)	T_3(40)	T_4(60)	T_5(80)
Dry matter	84.20	88.60	92.20	85.80	92.80
Crude protein	7.00	13.13	13.60	14.00	15.40
Crude fibre	3.20	6.70	9.30	12.50	8.00
Ash	5.50	12.00	12.50	16.50	25.00
Ether extract	5.00	20.00	12.50	12.50	17.50
Nitrogen free extract	63.50	36.77	44.30	30.30	26.9
Energy (kcal/g	2.27	2.53	2.81	3.90	4.23

Table 3: Nitrogen balance of growing Yankasa rams fed Sorghum Stover supplemented with graded levels of dried poultry droppings

Composition	Treatments (% SDPD inclusion levels)					
Parameters	T_1 (0)	T_2(20)	T_3(40)	T_4(60)	T_5(80)	LS
N intake	6.3^{e}	11.8^{d}	18.7^{c}	22.2^{b}	22.9^{a}	*
Faecal N	2.1^{e}	2.2^{d}	2.3^{c}	2.4^{b}	2.7^{a}	*
Urinary N	0.67^{d}	0.84^{a}	0.84^{a}	0.77^{c}	0.83^{b}	*
N retained	3.5^{e}	8.8^{d}	15.6^{c}	19.0^{b}	19.4^{a}	*
N retained (%)	54.4^{e}	71.4^{d}	73.9^{c}	82.8^{b}	85.7^{a}	*

abcde: Mean values with the same letters along the row are not significantly different ($P < 0.05$)
LS: Level of Significance, * = Significant ($P<0.05$), NS = not significant ($P>0.05$)

Results indicate positive nitrogen balance for animals in all the treatment groups supplemented with sun-dried poultry droppings. This could be due to the animals' ability to meet their daily protein needs for both maintenance and production. N intake was higher for the treatment groups fed sun-dried poultry droppings and the value increases as the level of (SDPD) inclusion increases. The same trend was observed for N retained. This is similar to the findings of Sebata *et al.,* (2005); Betsha and Melaku, (2009); Akinyemi *et al.,* (2010); Khan *et al.,* (2010); and Ekeocha and Akinsoyinu, (2014) in their separate studies reported higher N intake and N retention in poultry litter supplemented groups than the control groups. Percent N retained also followed the similar trend as was observed for both N intake and N retained. The higher values observed for N intake, N retained and Percent N for all the treatment groups supplemented with sun-dried poultry droppings could be attributed to the better quality of the dietary protein intake. Similar trend were observed for Urinary N except for Treatment T_2 and T_3 whose values were higher than other treatments in supplemented group. The high urinary excretion of N in the animals supplemented with sun-dried poultry droppings could be attributed to the expected high rumen degradability of N contained in poultry litter.

CONCLUSION

It was concluded that sun-dried poultry droppings included in the diets of growing Yankasa rams up to 80% improves Nitrogen intake, nitrogen balance and retention.

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