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PERFORMANCE OF *YANKASA* RAMS FED *Panicum maximum* AS BASAL DIET SUPPLEMENTED WITH POULTRY WASTE

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ABSTRACT

A feeding trial was conducted to determine the effect of supplementing Guinea grass hay with poultry waste on the performance of *Yankasa* rams. Sixteen Yankasa rams, aged 7-10 months with an average live-weight of 17kg, were subjected to four treatment diets each consisting of four replicates in a randomized complete block design (RCBD). The four dietary treatments were Treatment 1 (sole guinea grass), Treatment 2 (Guinea grass + 50g Poultry waste), Treatment 3 (Guinea grass + 100g Poultry waste) and Treatment 4 (Guinea grass + 150g Poultry waste). The result showed that rams fed Treatment 1 recorded the least feed intake and weight gain than Treatment 2, Treatment 3 and Treatment 4 which were supplemented with poultry waste. The live-weight gain of Yankasa rams was not significantly ($P>0.05$) different. The water intake of rams was not significantly ($P>0.05$) affected by poultry waste supplementation. The nutrients digestibility was significantly ($P<0.05$) affected by the supplementation of poultry waste. The result indicated that feeding poultry waste up to 150 g as supplement with Guinea grass could lead to improved feed intake, weight gain, digestibility and nutrients utilization by Yankasa rams.

Keywords: Digestibility; Guinea grass; Poultry waste; Yankasa rams

INTRODUCTION

In many developing countries particularly the tropical regions, livestock depend on the poor quality native pasture especially during the dry season when pasture growth virtually ceases. The available pasture at that time is of low quality; in terms of protein, minerals and vitamins, and unable to maintain weight of the animals (Aduku, 2004). This problem has led to malnutrition and drop in productivity of the animals in terms of milk and meat (Esanu and Fall, 2011), while the human population is increasing at faster rate and the grazing lands are decreasing due to competition for agricultural activities, road constructions and houses by man (Lakpini, 2002). It was also observed that animals suffer nutritional stress in the dry season when natural pastures are of low nutritional values and short supply, thus they walk long distances in search of natural pastures. This resulted in loss of weight and productivity in terms of meat, milk and consequent economic lost to the small holder farmer (Lakpini, 2002).

Despite the contribution of small ruminants to Nigerians, the production potentials of the animals in terms of meat and milk have not yet been exploited (Aduku, 1993and Lakpini, 2002. One of the major constraints to small ruminant production in Nigeria is nutrition; which constitutes about 85% of total cost of production (Alawa and Umunna, 1993). Nuru (1982) also reported that nutrition is the most serious constraints in most developing countries in terms of livestock production. The competition between man and animals for available grains makes it impossible to meet the nutritional requirements of animals at reasonable costs to meet their protein and energy needs especially in the long dry season when herbage quality is at its lowest. There has been global search for alternative feed sources for sustainable animal production. Conventionally; poultry waste is used as fertilizer mainly to supplynitrogen to the soil (Smith and Wheeler (1979) (source?). It is rich in nitrogen and half of which is true protein and the remaining part is mostly uric acid and ammonia both of which are non- protein nitrogen material (El-Ashry *et al*., 2000) source?). Poultry waste is a mixture of excreta, spilled feed, feathers and materials used as bedding in poultry houses and used most efficiently by ruminants as protein supplement (Fontenot, 1990 and World Poultry Science, 2010). It has the potential to replace soybean meal-based protein supplement with decreased feed cost. However, the feeding value of poultry waste as a protein supplement to ruminants has not been determined in the study area. In addition, poultry waste contributes significant amount of calcium, Phosphorus, potassium and numerous trace mineral supplements (Gerken, 1990) and if the diets contain at least 20% poultry waste, there will be no need of mineral supplementation. Therefore, this study was meant to measure the response of Yankasa rams fed poultry waste as supplement in Adamawa State, Nigeria.

MATERIALS AND METHODS

Study Area

The study was conducted at the Teaching and Research Farm of the Department of Animal Science and Range Management, Modibbo Adama University of Technology, Yola, Adamawa State. Yola is located in the North Eastern part of Nigeria. It is situated within the Savannah region and lies on latitude $7^0 11^1$ North and longitude $11^0 14^1$ East and altitude of 185.9 m above sea level. Yola has a tropical climate marked by rainy and dry seasons, with annual rainfall ranging from 700 to 1600 mm. Maximum temperature can reach 40^0C particularly in April, while minimum temperature can be as low as 18^0C (Bashir, 2002).

Experimental Animals and their Management

Sixteen Yankasa rams aged between 7-10 months with an average live weight of 17kg were purchased at Ngurore sheep and goats market of Adamawa State and were transported to the Teaching and Research Farm of the Department of Animal Science and Range Management, Modibbo Adama University of Technology, Yola, Adamawa State. They were adapted to the experimental feed and new environment for a period of 14 days. Thereafter, the animals were dewormed with Albendazole and dipped in acaricide solution against internal and external parasites.

Treatments and Experimental Design

The 16 Yankasa rams were fed Guinea grass as basal diet which was bought from sellers at the river Benue bank of Yola and poultry wastes as supplement which was obtained from the university poultry farm and fed alone as supplement at four treatment levels of 0, 50, 100 and 150 g; designated as T1, T2, T3 and T4, respectively. The treatments were laid out in randomized complete block design (RCBD) replicated four times.

Feeding Trial

Feeds were offered twice daily in the morning (8.00 am) and evening (4.00 pm), while salt lick and water were provided *ad libitum.* The leftover of feed were weighed every morning before the next feeding which lasted for ninety days. The performances of the rams in terms feed intake, weight gain and feed conversion ration were determined by weighing them with scale on weekly basis.

Digestibility Study

Digestibility study was conducted immediately after the feeding trial. Twelve animals were selected from all the treatments and taken to the metabolic crates for the digestibility study consisting of three animals each per treatment. They were allocated to the same treatment diets used in the feeding trial and adapted to the new environment for seven days, after which the animals were fitted with an improvised bags to facilitate the trapping of the faeces. The faecal l collection lasted for five days. Feed offered and refusals were weighed daily. Total faecal output was measured daily using a weighing scale and 10% sub-sample were dried and stored for dry matter determination and subsequent chemical analysis.

Chemical Analysis

Proximate composition of the feeds and faecal samples were determined by the standard methods of the Association of Official Analytical Chemists (A. O. A. C., 2004). Acid detergent fibre and Neutral detergent fibre were determined according to the methods of Van Soest and Robertson (1985).

Data Analysis

Data collected from the study were subjected to analysis of variance (ANOVA) using RCBD design, and least significant difference LSD) was used to separate significantly different treatment means (Steel and Torries, 1980).

RESULTS

Table 1 shows the chemical composition of the *Panicum maximum* and the Poultry waste fed to the Yankasa rams. The performance characteristics of Yankasa rams fed

guinea grass and poultry waste as supplement is shown in Table 2. The feed intake shows no significant (P>0.05) difference across the treatment groups, but numerical values for intake increases with level of supplement. The daily water intake also shows no significant (P>0.05) difference in all the treatments, but numerically higher water intake of 2.92L was recorded in T4 which had the highest supplement level (150g). Feed conversion ratio was also not significant (P>0.05), but improves with increase in supplement levels. Feed intake as percentage of body weight was also not significant (P>0.05) across treatment groups. Daily weight gain was not influenced by the treatment diets, even though both parameters increased numerically with increase in the level of supplementation.

Table 1: Chemical composition of *Panicum maximum* and poultry waste

Constituents %	Panicum maximum	Poultry waste
Dry matter	93.5	92.5
Crude protein	7.36	14.8
Crude fibre	29.5	9.5
Lipid	2.5	0.5
Ash	12.0	22.5
Nitrogen free extract	36.0	45.2

Table 2: Performance of Yankasa rams fed *Panicum maximum* as basal diet with poultry waste as supplement

Parameters	T1	T2	T3	T4	LSD
Feed intake (g/day)	450.83	454.62	474.09	487.09	1.71^{ns}
Water intake (L))	2.85	2.87	2.87	2.92	1.24^{ns}
Feed conversion ratio	18.20	16.71	16.83	15.83	3.75^{ns}
Dry Matter Intake as % BW	2.00	1.82	1.81	1.78	0.18^{ns}
Initial Live-weight (kg)	19.85	19.37	19.50	19.52	1.71^{ns}
Final Live-weight (kg)	22.10	21.87	22.13	22.25	1.55^{ns}
Live-weight gain(kg)	2.25	2.50	2.63	2.73	0.36^{ns}

T=Treatment, NS=not significant, LSD=Least significant different

The nutrient intake of Yankasa rams is presented in Table3. Significant difference (p<0.05) occur in the dry matter, crude protein and crude fibre intakes. Higher intake of these nutrients was recorded with increasing supplement level. Organic matter and ash intakes were similar (P>0.05) across treatment groups.

Table 3: Nutrient intake of Yankasa rams fed *Panicum maximum* as basal diet supplemented with poultry waste

Parameters	T1	T2	T3	T4	LSD
DMI (g/day)	419.27^{c}	422.79^{c}	441.45^{b}	452.99^{a}	9.86*
OMI (g/day)	342.62	345.5	360.75	370.18	28.75^{ns}
CPI (g/day)	63.12^{bc}	63.65^{ab}	66.46^{a}	68.19^{a}	4.14*
CFI (g/day)	85.66^{b}	86.34^{b}	90.19^{a}	92.55^{a}	5.29*
Ash (g/day)	76.64	77.29	80.69	82.81	5.19^{ns}

T=Treatment

Nutrients digestibility of the Yankasa rams fed varying levels of poultry waste as supplement is presented in Table 4. There was significance (P<0.05) difference in dry matter digestibility, while digestibility for all the other nutrients were similar across the treatment groups.

Table 4: Nutrients digestibility of Yankasa rams fed *Panicum maximum* as basal diet and poultry waste as supplement.

Apparent Digestibility (%)	T1	T2	T3	T4	LSD
Dry matter digestibility	55.20[b]	56.09[a]	58.25[a]	60.18[a]	4.32*
Crude protein digestibility	50.11	52.52	51.72	57.26	8.57[nss]
Crude fibre digestibility	51.28	63.25	69.23	45.30	26.92[ns]
Nitrogen free extract digestibility	40.07	36.09	36.04	47.66	17.57[ns]

T=Treatment

DISCUSSION

Dry matter content of *Panicum maximum* obtained in the study was similar to the values reported by Aganga and Tshwenyane (2004) during dry and wet season respectively. The crude protein content of 7.36% obtained was comparable to 7.67% reported by Bankole *et al*. (2003), but slightly lower than a range of 8-18% reported by Thomas and Grof (1986), Aregherore (2003), Babayemi *et al*. (2009) but lower than 10.62% reported by Yousuf *et al.* (2009). The crude protein obtained in the study is comparable with the 7-8% crude protein recommended as the least value required by ruminants for efficient performance (Milford and Minson, 1967). The crude fibre content of 29.5% in this study is similar to 31.7% reported by Aganga and Tshwenyane, 2004 and 30.3% reported by Babayemi *et al*. (2009). Ash content is within the range of 6.6-14.2% reported by Abdurazak *et al*. (2006). The values of the nutrient contents *Panicum maximum* obtained in this study are comparable to other findings in other areas and could reasonably be used in ruminant nutrition if adequate quantities are provided during the period of scarcity as a solution to the factor limiting production.

The differences in nutrients content of the forage could be attributed to differences in stage of growth, soil and method of processing of methods which agrees with the earlier report by Tessema (2008) and Ecocrop (2014) that the drop in nutrient contents could be due to rapid dilution by the accumulation of cell wall carbohydrates. The dry matter content of the poultry waste (92.5%) is similar to 92.3% reported by Adeyele *et al*. (1983) and slightly lower than 94.3% reported by Lanyasunya *et al.* (2006) in Kenya, but is also higher than 87.6% reported by FAO (2002 From BOGOhl's. The crude protein content of the poultry waste (14.8%) is similar to the 15.4% reported by Lanyasunya *et al.* (2006) but lower than 26.60% reported by Ndubueze *et al*. (2006) and 28.20% reported by Abdul *et al.* (2008). It is however within the range of 14-30% reported by Bhattachary *et al.* (1966) in Kenya. The CF content (9.5%) was lower than 20.67% reported by Bello *et al.* (2013) which could be attributed to feed, feather contents or type of bedding used. The Ash content (22.5%) was similar to 20.5% reported by Lanyasunya *et al*, 2006, but lower than 33.00% reported by Bello and Tsado (2013). The NFE content (45.2%) is comparable to 42.6% and 45.0% reported by Salama and Elashry (2000) in Cairo, Egypt. The variations in crude

protein content of the poultry waste agrees with Bello and Tsado (2013)past research reports and attributed to quality of ration offered to the birds, their age, amount of feed wasted, the type and amount of bedding used and amount of water spillage.

The feed intake in this study is similar to the report by Babayemi *et al*. (2006) who stated that feed supplementation increases intake and utilization of Panicum maximum with lablab, lucaena or gliricidia as supplement by animals. A similar finding was reported by Mubi *et al*. (2008) in a trial with growing heifers fed sorghum stover with poultry waste as supplement and observed a significant increase in feed intake of the supplemented groups. Mubi *et al.* (2008) in separate study with heifers fed sorghum stover and poultry waste as supplement and reported increased higher intake and utilization which could be attributed to specie difference of animal or variety of sorghum stover, stage of maturity.Abdul *et al.* (2008) gave a similar report that supplementation increases intake of sorghum stover with poultry waste by wadara cattle. The water intake is similar to the report by Osuhor *et al.* (2004) with Yankasa rams fed a basal diet of maize stover and lablab hay as supplement. The result is higher than the range values of 2.37 to 2.46 L/h/day reported by Ajiji *et al*. (2013) who fed *gamba* grass hay with *acacia* pods as supplement. Feed conversion ratios of 16.83-18.20 were slightly higher than the range of 20.6-50.6 reported by Aye (2007) who reported higher feed conversion ratio with the supplemented groups with multi nutrients block for ruminant and alcohol from the waste products of *Lucaena lucocephala* and Gliricidia sepium than the control.

The Live- weight gain of Yankasa rams fed Guinea grass with poultry waste as supplement is similar to the report by Njiwe and Kona (1994), who showed an increase in the live-weight of goats fed elephant grass as basal feed and *Stylo* hay as supplement than those animals fed elephant grass alone. A similar result was also reported by Sukkasem *et al*. (2002) that goat fed signal grass hay supplemented with stylo showed increased weight gain of the animals than those fed sole signal grass. Getachew *et al.* (1994), however, reported a weight loss and low feed intake from Ethiopian highland sheepsheep fed maize stover and Stylo hay as supplement. The dry matter intake of the Yankasa rams agrees with the report by Tolera and Sundstol (2000) that as supplementation increases, nutrient intake of sheep fed a basal diet of maize stover with *Desmodium intortum* as supplement also increases. Goodchild and Mcmeniman (1994) also reported an increase in nitrogen (N) which is precursor for crude protein production and organic matter intake (OMI) with increasing level of *Vigna mungo* hay as supplement. Bamikole *et al.* (2001) concluded that supplementation increases feed intake and nutrient utilization by steer grazing animals on natural pastures during dry season. The digestibility of DM, CP, CF and NFE increases with the supplement level across the treatments.

The dry matter digestibility increases with level of supplementation and was significant ($P<0.05$ which could be attributed to the stage of growth as they were harvested before tasselling and high crude protein content of the poultry waste. This has confirmed the importance of poultry waste as reported by Lanyasunya *et al*. (2006) who fed poultry manure as supplement to dairy cattle and obtained high milk yield which was attributed to the high digestibility to the crude protein content of the poultry manure. Oldhan and Alderman (1980) established that ad libitum intake and digestibility is increased by increase in crude protein content of feed fed to ruminants. The crude fibre digestibility obtained was similar to the report of Owen (1993) and Aye (2007) who used *Gliricidia* based multi-nutrient block supplement in ruminant feeding and reported high intake and digestibility of nutrients. The NFE digestibility obtained in Yola, Adamawa State also agrees with the

report by Kamaluddeen (2013) and Quala *et al*. (2011) that the activity of ruminal microbes is improved by the high nitrogen levels in the supplemented diets than the control, which probably resulted in high digestibility. Tolera and Sundstol (2000) in another study with sheep reported increased digestibility as supplementation increased. The poultry waste when used as supplement to *panicum maximum* based diet improved the dry matter intake, nutrients digestibility, utilization and growth rates of Yankasa rams.

CONCLUSION

The inclusion of poultry waste as supplement to *Panicum maximum* based diet had led to a remarkable increase in dry matter intake, live weight gain and nutrient digestibility of Yankasa rams than those on control diet. The higher inclusion level of 150g poultry waste as supplement generally enhanced performance of the animals, but had no significant ($P<0.05$) effect on the feed intake and nutrient utilization. It is therefore evident that supplementation of *panicum maximum* based diet with poultry waste increase intake, digestibility, utilization and growth rates performance of Yankasa rams.

Poultry waste could be used for ruminants feeding as supplement to the low quality grasses that are available during the dry season and could increase the productivity of the animal throughout the season.

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