

EFFECT OF CINNAMON POWDER SUPPLEMENTS ON GROWTH PERFORMANCE OF YANKASA RAMS

Salisu, U.S., Garba, M.G., Murtala, U. and *Gaddafi, S.

Department of Animal Science, Federal University Dutsin-Ma, Katsina State, Nigeria

*Correspondent Author's Email: sanigaddafi4@gmail.com, Phone number: 07067212353

ABSTRACT

This experiment was conducted to evaluate the effect of cinnamon supplement on growth performance of Yankasa Rams. A total number of sixteen (16) Yankasa grower rams with average live weight of 23kg each was randomly allotted into four dietary treatment comprises four replicates consist of four animal per treatment in a completely randomized design (CRD), were data obtained in this study were analyzed using General Linear Model of Statistical Analysis Software and Means were separated using Duncan Multiple Range Test. The growth performance result revealed that there were significant ($P<0.05$) differences in final weight with Treatment 2 had the highest final weight. The result further revealed that Average daily gain and average feed intake were statistically ($P<0.05$) difference across the treatment while initial weight, weight gain, feed intake and feed conversion ratio were not significantly ($P>0.05$) differences. It is therefore concluded that cinnamon supplementation have a profound effect of improving growth parameters of Yankasa rams such as final weight and average daily feed intake and it is therefore recommended cinnamon powder can be supplemented up to 15g/kg diet in Yankasa rams without deleterious effect on growth performance.

Key words: Cinnamon, Supplement, Growth, Yankasa Rams

INTRODUCTION

Livestock production is a cornerstone of agricultural economies, providing vital food sources, job opportunities, and economic support to people all over the world (Herrero *et al.*, 2012). Nigeria, a country with a significant agricultural sector. African small ruminants such as the Yankasa rams, an indigenous Nigerian breed, are particularly important in this context due to their resilience to a wide range of climatic conditions, making them a crucial resource for the country's livestock production (Hassan *et al.*, 2015). Cinnamon is a spice obtained from the inner bark of several tree species from the genus cinnamon. Cinnamon is used mainly as an aromatic condiment and flavoring additive. The volatile fatty oils obtained from the bark, leaf and root of cinnamon is very significant in chemical composition which suggested that they vary in their pharmacological effects as well (Shan *et al.*, 2002). The most important constituents of cinnamon are cinnamaldehyde *trans*-cinnamaldehyde, which are present in the essential oil, thus contributing to the fragrance and to the various biological activities observed with cinnamon (Jiang, *et al.*, 2017). The objective of this study was to evaluate the effect cinnamon powder on growth performance of Yankasa rams.

MATERIALS AND METHODS

Experimental Site

This experiment was carried out at Small Ruminant unit of Livestock Teaching and Research Farm, Department of Animal Science, Federal University Dutsin-Ma, Katsina State. The site lies between latitude 12°27'18"N and 7°29'29"E and 605 meters above sea level with an annual average rainfall of 700mm within Sudan Savannah ecological zone (Gaddafi *et al.*, 2019).

Animal Management:

A total number of sixteen Yankasa growers rams with average live weight of 20kg and were quarantine in a holding pen which they was given prophylactic doses of antibiotics (Tetracycline LA) and dewormed (Ivermectin).

Experimental Design:

Experiment I: A total number of sixteen (16) Yankasa growers rams with average live weight of 20kg each was randomly allotted into four dietary treatment comprises four replicates consist of four animal per treatment in a completely randomized design (CRD) was used for growth performance and nutrient digestibility. Feed and water were given to the animal's *ad libitum*.

Cinnamon Preparation: A dry cinnamon bark was procured in Katsina central market, after then the bark was crushed using mortar and pastel to obtain the fine particles and preserved in polyethane bags for ration formulation.

Experimental Diet: Four different diet were formulated according NRC recommendation for grower rams (2000) and four different supplement of cinnamon powdered were also included at a rate of 0g/kg, 5g/kg, 10g/kg and 15g/kg diet for T1, T2, T3 and T4, respectively.

Table 1: Experimental Diet Composition

Ingredients	Percentage (%)
Maize	8
Maize bran	19
Wheat offals	30
Cotton seed cake	15
Groundnut cake	7
Guinea corn husk	9
Groundnut hay	10
Bone meal	1
Common salt	1
Total	100
Calculated Analysis	
Energy (Kcal/kg)	1960
Crude protein	14
Ether extract	2
Organic matter	88
Crude fibre	18
Neutral detergent fibre	30.4
Acid detergent fibre	9.5
Ash	7.0

Data collection

Laboratory Analysis

The sample of the experimental diets were analyzed for the dry matter (DM), Crude protein (CP), Crude fibre (CF), Ether extract (EE), ash and nitrogen free extract (NFE) according to the method (AOAC, 2005). The fibre fractions, acid detergent fibre (ADF) and neutral detergent fibre (NDF) were determined according to the method described by (Van Soest, 1970).

Metabolizable energy of the diets was estimated using the equation of Alderman, 1985)

$$ME \text{ (MJ/KgDM)} = 11.7 + 0.00654CP + (0.000665EE)^2 - CF(0.00414EE) - 0.0118A$$

Where:

A = Ash content, CP = Crude protein, EE = Ether extract, CF = Crude fibre

Growth performance: Initial weight at the beginning of the experiment was determined and recorded accordingly, feed intake, weight feed conversion ratio and final weight were determined using the following formular outline as follows:

- Feed intake = Amount of feed given – Left over
- Weight gain = Final weight – Initial weight
- Feed conversion ratio = Total amount of feed consumed by animal divide by total weight gained by the animal

RESULTS AND DISCUSSION

Proximate Composition of the Experimental Diet

The proximate composition of the experimental diet were presented in Table 4.1 below. The crude protein content obtained in the experimental diet fall within the crude protein content ranges of breeder rams recommended by NRC (2000) from 12 – 26%.

Table 2: The Proximate Composition (%) of the Experimental Diet

Compositions (%)	T1	T2	T3	T4
Dry matter	97.41	95.41	95.02	94.83
Organic matter	90.09	89.56	90.55	91.36
Crude Protein	18.39	21.94	16.38	14.94
Ether Extract	7.93	7.02	7.28	8.00
Crude Fiber	18.39	15.59	15.55	17.14
Ash	13.60	9.51	9.97	9.00
NFE	45.37	52.34	52.81	55.83
NDF	34.10	33.78	33.80	38.23
ADF	21.02	21.81	22.31	23.36
Hemicellulose	13.09	10.89	11.52	13.85

Effect of cinnamon supplementation on growth performance of Yankasa Rams

The Growth performance of Yankasa rams supplemented with cinnamon were presented in table 3 below. The result indicated that there were homogenous statistical non differences ($P>0.05$) in initial weight of animals used in this study and this clearly shown that the weight of animals were appropriately balanced before the commencement of the experiment and this will help to reduced experimental error. The final weight of Yankasa rams in this study showed that there were significant ($P<0.05$) differences in which T2 had the highest final weight (28.000 kg) followed by T4, T1 and T3 with 27.350 kg, 26.550 kg and 25.500 kg respectively. The average daily feed intake revealed that there were significant ($P<0.05$) differences. The result were however, showed that there were significant ($P<0.05$) differences in average daily weight gain were rams in T2 had the highest daily weight gain with 81.25g per day followed by T4 with 66.66g per day while rams in T3 had the lowest daily weight gain of 37.25g per day. It was also recorded that there were no significant ($P>0.05$) differences in weight gain, feed intake and feed conversion ratio. However, a considerable numerical variations were observed across the treatment groups.

Table 3: Effect of cinnamon supplementation on growth performance of Yankasa Ram

Parameters	T1	T2	T3	T4	SEM	LOS
Initial weight (kg)	23.250 ^a	23.225 ^a	23.550 ^a	23.350 ^a	0.048	NS
Final weight (kg)	26.550 ^b	28.000 ^a	25.500 ^b	27.350 ^a	1.995	*
ADG (g/day)	55.00 ^c	81.25 ^a	37.25 ^d	66.66 ^b	0.004	*
Weight gain (kg)	3.300 ^a	4.875 ^a	2.235 ^a	4.000 ^a	2.014	NS
ADFI (g/day)	13.26 ^b	14.07 ^a	11.51 ^d	13.19 ^c	0.021	*
Feed intake (kg)	0.796 ^a	0.843 ^a	0.690 ^a	0.791 ^a	0.072	NS
FCR	3.980 ^a	5.737 ^a	3.184 ^a	4.545 ^a	2.154	NS

ADG = Average daily gain, ADFI = Average daily feed intake, FCR = Feed conversion ratio, SEM = Standard error mean and LOS = Level of significance.

CONCLUSION AND RECOMMENDATION

It is therefore concluded that cinnamon supplementation have a profound effect of improving growth parameters of Yankasa rams such as final weight and average daily feed intake and it is therefore recommended cinnamon powder can be supplemented up to 15g/kg diet in Yankasa rams without deleterious effect on growth performance.

REFERENCES

- AOAC (2005). Official Methods of Analysis, 18th edn. Association of Official Analytical Chemists, Washington
- Gaddafi, S., Garba, M.G., Ajibola, O.O., Alkali, M.M. and Dabai, M.I. (2019). A Photo- Essay on pasture establishment at Livestock Teaching and Research Farm, Federal University Dutsin-Ma, Katsina State. Proceedings at the 3rd Biennial Conference of the Society for Grassland and Development in Nigeria Held at the National Animal Production Research Institute, A.B.U-Shika, Zaria, 3rd-6th Nov., Pp 44-49.

- Hassan, D. I., Mbap, S. T., & Naibi, S. A. (2015). Socio- Economic Characteristics of Yankasa Sheep and West African Dwarf Goat's Farmers and Their Production Constraints in Lafia, Nigeria. *International Journal of Food, Agriculture and Veterinary Sciences*, ISSN: 2277-209X, Vol. 5 (1): 82-93.
- Herrero, M., D. Grace, J. Njuki, N. Johnson, D. Enahoro, S. Silvestri, M.C. Rufino. (2012). The roles of livestock in developing countries. *Animal: An international journal of animal bioscience*, Vol. 7: 1-16. DOI: 10.1017/S1751731112001954.
- Jiang, J., Emont, M. P., Jun, H., Qiao, X., Liao, J., Kim, D.-I., & Wu, J. (2017). Cinnamaldehyde induces fat cell-autonomous thermogenesis and metabolic reprogramming. *Metabolism*, 77, 58-64. <https://doi.org/10.1016/j.metabol.2017.08.006>
- NRC (2000). Nutritional Requirement of Domestic Animals. Nutrient requirement of Sheep. 6th Edition. *National Academy of Sciences- National Research Council*, Washington DC., USA.
- Shan, B. Cai, Y. Z. Sun, M. and Corke, H. (2005). "Antioxidant capacity of 26 spice extracts and characterization of their phenolic constituents," *Journal of Agricultural and Food Chemistry*, 53, 20, 7749–7759, View at: Publisher Site | Google Scholar
- Van Soest, P. J., Robertson, J. B. and Lewis, B. A. (1991). Methods for dietary fiber, neutral detergent fiber and non-starch polysaccharides in relation to animal nutrition. *Journal of Dairy Science*, 74: 3583-3597