

EFFECTS OF VARYING LEVELS OF MORINGA (*Moringa oleifera*) LEAF MEAL ON THE GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF WEANER RABBITS

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ABSTRACT

Performance of weaner rabbits fed varying levels of *Moringa oleifera* meal (MOLM) was investigated using sixteen mixed breed weaner rabbits of average weight of 400-600 grams (5-7 weeks) old. The rabbits were randomly allotted to four dietary treatment groups in a completely randomized design (CRD) and each treatment was further sub-divided into four replicates, each having one rabbit per replicate. They were fed growers ration supplemented with *Moringa oleifera* leaf meal at varying levels of 0%, 5%, 10% and 15%. Results obtained showed that rabbits on 10% *Moringa Oleifera* Leaf Meal diet achieved the highest weight gain (1575g) while T_2 , T_1 and T_4 recorded weight gains of 1500, 1400 and 1066.67g respectively. The result of the mean effects of the treatment on the feed intake revealed that treatment 1, 2 and 4 has significant effect on the feed intake but there was no significant difference between 2 and 3 as well as treatment 3 and 1. The carcass evaluation revealed a very strong, positive and highly significant relationship between dressed weight and carcass length (0.98, $P \leq 0.01$). The result of this experiment revealed that MOLM at 10% level of inclusion can support the growth of rabbit without any deleterious effect on growth performance and health status of weaner rabbits.

Keywords: *Moringa*, Performance, Carcass, Weaner.

INTRODUCTION

The rapid growth of human and livestock population create increasing demands for food and nutrition security in the least developed countries that alternative feed resources must be identified and evaluated (Olugbemi *et al.*, 2010). The inadequate supply and intake of animal protein in developing countries is high due to high cost of feeding with the accompanying high cost of production. One of the ways of reducing the cost of production and making protein available to people at cheaper prices is by the use of agricultural by-products and tropical plants which are not directly used by humans as food to feed livestock (Asar, 2010).

Rabbit plays a vital role in the utilization of fibrous by-products which can be converted into animal protein for the Nigerian populace. They are efficient converters of feed to meat and can utilize up to 30% crude fibre as against 10% by most poultry species (Egbo *et al.*, 2001). Rabbits can utilize unconventional feedstuffs such as blood meal and diverse forage materials such as wild sunflower. This is why attention is now being shifted to rabbit production in order to solve the problem of shortage of protein. Therefore, alternative feed sources need to be investigated such as, *Moringa oleifera*, the leaves of which have been used as animal feed in many places.

For the past two decades the interest of animal producers has been centred mostly on search for cheaper feed ingredients that are always available and have no competition with man's dietary demand. Feed alone accounts for up to 70% of the total cost of production and there can be no success in raising rabbits if proper attention is not given to diet and if wholesome feed in adequate quantity are not provided (Compaoré *et al.*, 2011). *Moringa oleifera* leaves, fruits, immature pods and flowers are integrated into the traditional food of humans in several tropical and subtropical countries (Siddhuraju & Becker 2003, Anhwange *et al.*, 2004).

This study is designed to investigate the feeding varying levels of moringa leaf meal on the performance and carcass characteristics of weaner rabbits.

MATERIALS AND METHODS

Experimental Procedure

The research was conducted at the Piggery and Rabbitry unit of Federal College of Forestry Jos, Plateau State, Nigeria. Twelve (12) cross bred rabbits of both sexes made up of four males and eight females were used for the experimental study. Three (3) rabbits were randomly assigned to each treatment in the ratio of one (1) male and two (2) females per treatment. The experiment lasted for six (6) weeks after a one week of pre-feeding trial. *Moringa oleifera* leaves were harvested from mother tree, air dried and ground into powder before incorporating into the rabbit's diets. Four experimental diets were formulated containing 0%, 5%, 10% and 15% *Moringa oleifera* leaf meal (MOLM). Known quantities of feed were fed daily to each group. Water was given ad libitum. Prior to the commencement of the experiment, the rabbits were prophylactically treated against parasites (internal and external).

Data Collection, Experimental Design and Statistical Analysis

At the end of the experiment, the parameters assessed include; average daily feed intake; average body weight; average weight gain; carcass characteristics (live weight (kg), dressed weight (kg), dressed percentage (%), carcass length (cm), head weight (g), thorax width (g), loin weight (g), fore limb weight (g), hind limb weight (g), liver weight (g), heart weight (g), kidney weight (g), lungs weight (g) and spleen weight (g)).

A completely randomised design was adopted for the study. All data collected at the end of the six weeks were subjected to analysis of variance (ANOVA) using SAS (2001), and differences between the treatment means were separated using Duncan's New Multiple Range Test (DMRT) at 5% level of significance.

RESULTS AND DISCUSSION

Performance of Rabbit Fed Graded Level of *Moringa oleifera* Leaf Meal

The performance of rabbit fed graded levels of *Moringa oleifera* leaf meal on the growth performance of weaner rabbits (1-6 weeks) revealed that there was significant in Daily Feed Intake (DFI) among the treatments. Rabbits fed diet at 15% level of inclusion had the lowest numerical value of 1.60g followed by diets 10%, 0% and 5% respectively. As the quantity of the *Moringa oleifera* increases the intake decreases, although there was no significant difference ($P > 0.05$) in feed intake among the treatment. This corroborates that of Shaalu *et al.*, (2008) and Kakengi *et al.*, (2007). Daily Weight Gain (DWG) of the rabbits shows that there was significant difference among the diets. The highest value was obtained on rabbit fed at 15% level of inclusion of the experimental diets with a value of 4.61 (15%) followed by 4.06 (10%), 4.05 (5%) and 3.96g (0%) respectively. This shows that diets containing 15% MOLM produced rabbits with higher body weights and higher weight gain than rabbit in the other diets (Table 1). The higher body weight gain might be an indication that the diets were more palatable and easily assimilated by the rabbits. This is in agreement with (Kakengi *et al.*, 2007), who reported that MOLM diets were highly preferred by chickens because of its palatability. Similar result was reported by Onimisi *et al.*; (2007), when they fed MOLM to rabbits.

A very strong, positive and highly significant relationship was observed between dressing weight and carcass length (0.976 at 0.01 level). This implies that an increase in the dressing weight will lead to an increase in the carcass length and vice versa. There was a strong, negative and insignificant relationship between carcass length and spleen weight (-0.762). The implication of this is that, an increase in the carcass length will result in a decrease in the spleen weight and vice versa (Table 2).

Table 1: The performance of rabbit fed graded levels of *Moringa oleifera* meal (1-6 week)

Parameters	T ₁ % (0)	T ₂ (5%)	T ₃ (10%)	T ₄ (15%)	SE±
Initial average body weight (g)	800	820	810	800	3.03
Final average body weight (g)	1066.67	1500	1400	1575	70.92
Daily average feed intake (g)	1.64 ^c	1.65 ^a	1.63 ^b	1.60 ^{ab}	0.01
Daily average weight gain	3.96 ^c	4.05 ^b	4.06 ^b	4.61 ^a	0.36
FCR (g)	0.40 ^a	0.41 ^{ab}	0.40 ^a	0.36 ^c	0.07
Mortality	1	0	0	1	0.18

a,b,c,d: means within the same row bearing different superscripts are significantly different

(P<0.05), SEM = Standard Error Means, FCR = Feed Conversion Ratio

Table 2: Effect of the treatment on the carcass characteristics of rabbits after six weeks

Parameters	LW (g)	DW (g)	DP (%)	CL (cm)	HW (g)	TW (cm)	Lo W (g)	FL W (g)	HL W (g)	LiW (g)	He W (g)	KW (g)	Lu W (g)	SW (g)
Live weight (g)	1													
Dressed weight(g)	2	1												
Dress percentage (%)	0.43	0.92												
Carcass length(cm)	8	2	1											
Head weight(g)	0.26	0.82	.976											
Thorax weight(cm)	8	9	*	1										
Loin weight(g)	0.68	.993	0.94	0.86										
Fore limb weight(g)	8	**	9	0	1									
Hind limb weight(g)	0.66	.992	.963	0.89	.996									
Liver weight(g)	5	**	*	0	**	1								
Heart weight(g)	0.79	.997	0.89	0.78	.988									
Kidney weight(g)	0	**	4	6	*	.981*	1							
Lungs weight(g)	0.87	.978	0.82	0.70	.952		.988							
Spleen weight(g)	2	*	2	1	*	0.945	*	1						
	0.67	.994	.960	0.88	.996	1.000	.983	0.94						
	3	**	*	6	**	**	*	9	1					
				-										
Liver weight(g)	0.44	0.32	0.15	0.03	0.36		0.38	0.36						
Heart weight(g)	4	2	9	4	0	0.273	3	9	0.273	1				
Kidney weight(g)	0.20	0.66	0.77	0.70	0.74		0.66	0.55		0.60				
Lungs weight(g)	5	9	7	7	9	0.713	7	4	0.706	8	1			
Spleen weight(g)	0.90	0.94	0.75	0.60	0.92		.969	.986		0.50	0.57			
	5	8	8	8	5	0.903	*	*	0.907	9	7	1		
	0.49	0.61	0.53	0.36	0.66		0.65	0.60		0.91	0.85	0.69		
	6	5	0	2	5	0.596	4	4	0.594	9	3	8	1	
		-	-	-	-		-	-		-	-	-		
	0.34	0.28	0.60	0.76	0.32	-	0.21	0.10	-	0.56	0.31	0.03	0.21	
	5	6	1	2	6	0.393	1	9	0.385	5	1	4	7	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

LW: Live weight, DW: Dressed weight, DP: Dress percentage, CL: Carcass length, HW: Head weight, TW: Thorax weight, LoW: Loin weight, FLW: Fore limb weight, HLW: Hind limb weight, LiW: Liver weight, HeW: Heart weight, KW: Kidney weight, LuW: Lungs weight, SW: Spleen weight

CONCLUSION AND RECOMMENDATION

It can be concluded that MOLM can be incorporated up to 15% level in the diets of weaner rabbits, since it met the growth performance without any deleterious effects. In this study, the best performance was observed by rabbits at T3 (15%) level of MOLM inclusion. This indicates that rabbits tolerate MOLM up to 15% level of incorporation for optimal performance. However, more research may be required on the use of *Moringa oleifera* leaf meal, as a protein supplement on the diets of other livestock species.

REFERENCES

- Anhwange, B.A., Ajibola, V.O. & Oniye, S.J. (2004). Chemical studies of the seeds of *Moringa oleifera* (Lam.) and *Detarium microcarpum* (Guill and Sperr), *Journal of Biological Sciences*. **4**: 711-715.
- Asar V.I. (2010). Utilization of corn-cob meal and faba bean straw in growing rabbits diets and their performance, digestibility and economic efficiency. *Egypt Poultry Science*. **30**:415-442.
- Compaore, W.R, Nikiema, P.A, Bassole, H.I.N., Savadogo, A., Mouecoucou., Hounhouigan, DJ. & Traore, S.A. (2011). Chemical composition and antioxidative properties of seeds of *Moringa oleifera* and pulps of *Parkia globosa* and *Adansonia digitata* commonly used in food fortification in Burkina Faso. *Current Research Journal of Biological Sciences*. **3** (1): 64-72.
- Egbo, M.L., Doma, U.D. & Lackaks, A.B. (2001). Characteristics of small rabbit productions and management in Bauchi metropolis. *In the book of proceedings of the 26th Annual conference of Nigerian society for animal production (NSAP)*, 18th -21 March, 2001, ABU, Zaria, Nigeria. pp. 160-162
- Kakengi, A.M.V., Kaijage, J.T., Sarwatt, S.V., Mutayoba, S.K., Shem M.N. & Fujihara, T. (2007). Effect of *Moringa oleifera* leaf meal as a substitute for sunflower seed meal on performance of laying hens in Tanzania. *International Journal of Poultry Science*, **9**: 363-367.
- Olugbemi, T.S, Mutayoba, S.K. & Lekule, P.P. (2010). Evaluation of *Moringa oleifera* leaf meal inclusion in cassava chip based diets fed to laying birds. *Livestock Research for Rural Development*, **22** (118): pp.127-132
- Onimisi, P.A., Omege, J.J. & Maiguizo, K. (2007). Evaluation of *Moringa (Moringa oleifera)* Leaf Meal as Protein Source in Rabbit Diets. *In the book of proceedings of the 32nd Annual Conference of the Nigerian Society for Animal Production (NSAP)* Calabar March 18-21. pp. 293-294.
- Siddhuraju, P. & Becker, K. (2003). Antioxidant properties of various solvents extracts of total phenolic constituents from three different agro climatic origins of drumsticks tree (*Moringa oleifera* Lam.) leaves. *Journal of agriculture and food chemistry*, **51**:2144- 2155.
- Shaal, D.T Carew, S.N & Ayoade, J.A. (2008). Growth performance, meat yield and organ weights of rabbits fed cassava leaf meal. *In the book of proceedings of the 13th Annual conference of Animal Science Association of Nigeria (ASAN)* Sept.15-19 ABU Zaria. pp.256-266