

EFFECTS OF FEEDING VARYING LEVELS OF MELON (*Citrullus vulgaris*) SEED HUSKS MEAL SUPPLEMENTED WITH MAXIGRAIN® ON PERFORMANCE OF FEMALE GROWING RABBITS (*Oryctolagus cuniculus*)

O. OLUKOTUN¹; A. AREMU²; I.C. ALEMEDE²; P.C. NWACHUKWU² AND O.D. ODIDI¹

¹Federal College of Forestry Mechanization, Afaka, Kaduna, ²Department of Animal Production, Federal University of Technology, Minna, oolugoke@yahoo.com (08036873742)

ABSTRACT

The experiment was conducted using 45 female growing rabbits with an average initial live weight of 927.78-943.33 g for a period of 91 days to study the effect of varying levels of melon seed husk (MSH) meal supplemented with or without multi-enzyme (MAXIGRAIN®) on the performance of the rabbits. Rabbits were randomly distributed into five treatments, each one contains nine rabbits. Three levels of melon seed husks and two levels of enzymes preparation were used. Melon seed husks were used at levels of 0 (control), 10 and 20 % of diets. MAXIGRAIN® enzyme containing cellulase, xylase, beta-glucanase and phytase was added at 0 and 0.1 % of diets. The dietary treatments were T1 – 0 % MSH & 0 % MAXIGRAIN® (control), T2 – 10 % MSH & 0 % MAXIGRAIN®, T3 – 20 % MSH & 0 % MAXIGRAIN®, T4 – 10 % MSH & 0.1 % MAXIGRAIN®, T5 – 20 % MSH & 0.1 % MAXIGRAIN®. The daily live weight gain for rabbits fed diets T1, T2, T3, T4 and T5 were 8.00, 7.88, 7.72, 8.50 and 7.94 g respectively and the differences among the dietary groups were not significant ($P>0.05$) but it numerically increased by 0.5 % in T4 as compared to control (T1). The feed conversion ratio of different dietary groups did not differ significantly ($P>0.05$). However, 8.28, 8.92, 9.84, 7.58 and 8.22 were observed for T1, T2, T3, T4 and T5 respectively. Conclusively, the results from this study showed that the use of melon seed husks in replacement of maize can be successfully fed at 10 % of growing rabbits diet supplemented with MAXIGRAIN® enzyme without adverse or deleterious effect on performance.

INTRODUCTION

Rabbits are pseudo-ruminant animals, which can make use of high crude fibre feed ingredients to improve their growth performance and health. Energy-providing feed (such as maize or corn) and body building food like soyabean and groundnut in form of cake as protein sources are required by monogastric animals. Soyabeans are not readily available (Metayoba *et al.*, 2011). Maize is expensive and groundnut cake (GNC) is scarce, thereby limiting the availability of these feed ingredients. Thus, there is competition for these feed ingredients between animals and humans, making them more expensive and their inclusion in livestock diet also increases the cost of production. Under normal conditions the cost of monogastric animal feed has been reported to account for over 70% of the total cost of production (Metayoba *et al.*, 2011). Consequently, nutritionists and research scientists are turning attention to alternative sources of feed ingredients such as agricultural by-products and agricultural wastes as part replacements for the expensive feedstuffs (Bawa *et al.*, 2008). These readily and

costless sources of feedstuffs are termed non – conventional feed ingredients in which one of such underutilized feedstuff is melon seed husk. One of the promising ways to maximize nutrient availability from alternate feed resources such as melon seed husks is through the use of enzymes. Addition of exogenous enzymes in diets to digest non- starch polysaccharides (NSPs) and phytate have been reported to improve the availability of nutrients from feed ingredients in broilers (Bharathidhasan, 1999). The aim of this work is to determine the effect of MAXIGRAIN® supplementation of diets containing varying levels of melon seed husks meal (MSHM) on performance of growing rabbits.

MATERIALS AND METHODS

This experiment was carried out at Rabbit Multiplication Centre of Niger State Ministry of Livestock and Fisheries, Bosso, Minna, Nigeria. Minna lies between latitude 9° 28' N to 9° 37' N and longitude 6° 23' E to 6° 33' E with annual rainfall of 1000 – 1500mm. Minna is in southern guinea savanna vegetation zone. Forty five female

growing rabbits with an average initial live weight of 927.78-943.33 g were used for the study, which lasted for thirteen weeks. The rabbits were randomly allotted to five experimental treatment diets in a completely randomized design with three replicates per treatment, with each replicate having three rabbits. The experimental diets were T1 - 0 % MSH & 0 % MAXIGRAIN® (control), T2 - 10 % MSH & 0 % MAXIGRAIN®, T3 - 20 % MSH & 0 % MAXIGRAIN®, T4 - 10 % MSH & 0.1 % MAXIGRAIN®, T5 - 20 % MSH & 0.1 % MAXIGRAIN® as shown in Table 1. Fresh feeds and clean, cool water were served for the rabbits *ad libitum* throughout the period of the experiment. The rabbits were raised in a cage. Daily feed intake, body weight gain, feed conversion ratio and mortality rate were measured to assess the performance of the rabbits. Proximate compositions of the experimental diets was determined by the method of the A O A C (2005). Data obtained were subjected to Analysis of Variance (ANOVA) using SAS/STAT (9.2) statistical package (SAS, 2008). Significant differences among the means were separated by Duncan Multiple Range Test using the same package.

RESULTS AND DISCUSSION

Table 1 showed the proximate composition of the experimental diets. The result of the proximate composition indicated that there was similarity in the composition of the diets. The performance of growing rabbits fed varying levels of melon seed husk meal supplemented with and without enzyme MAXIGRAIN® are presented in Table 2. The average final live weights of rabbits were 1614.44, 1603.33, 1578.33, 1657.78 and 1595.00 g for rabbits on diets T1, T2, T3, T4 and T5 respectively and did not differ significantly ($P > 0.05$). Considering weight gain relatively to the control, enzyme MAXIGRAIN® improved daily weight gain by 6.25 % in T4 (10 % MSH and 0.10 % MAXIGRAIN®). Significant differences ($P < 0.05$) were observed in total feed intake, daily feed intake and mortality rate. There was no significant difference ($P > 0.05$) in feed conversion ratio. The feed conversion ratio value for rabbits on diets T1 (8.28), T2 (9.92), T3 (9.84), T4 (7.58) and T5

(8.22) showed no significant differences ($P > 0.05$) among the treatments. The percentage mortality rate showed significant differences ($P < 0.05$) among the treatments. The decrease in feed intake witnessed in rabbits fed diet T4 (10 % MSH and 0.10 % MAXIGRAIN®) compared to the control may be due to the addition of MAXIGRAIN® enzyme. The result is in agreement with the work of Fasiullah *et al.* (2010) who reported that average daily feed intake of rabbits decreased due to addition of NATUZYME Plus® enzyme at levels of 35 and 50 g /100 Kg feed. Rabbits on diet T4 which contained 10 % MSH and 0.10 % MAXIGRAIN® had the highest daily weight gain of 8.50 g while T3 (20 % MSH and 0 % MAXIGRAIN®) had the least value of daily weight gain of 7.72 g. The improvement of daily weight gain in rabbits fed diet T4 that contained 10 % MSH and 0.10 % MAXIGRAIN® may be attributed to the enhancing effect of MAXIGRAIN® enzyme on micro flora growth in the gut and ceacum as well as the increase in volatile fatty acids and nutrients digestibility. This result agreed with the finding of Abaza and Omara (2011) who reported that rabbits fed diets with KEMZYME® enzyme showed an improvement remarkably in live body weight and daily body weight compared with those fed with the control diet. The result of this study revealed that rabbits fed diets T4 (10 % MSH and 0.10 % MAXIGRAIN®) and T5 (20 % MSH and 0.10 % MAXIGRAIN®) that were supplemented with MAXIGRAIN® enzyme gave the best feed conversion ratio values of 7.58 and 8.22 respectively. This means that the diets supplemented with MAXIGRAIN® enzyme performed better in the ability to convert feed to kilogram meat than the control diet and diets that contain melon seed husks meal without the enzyme. This result is in agreement with the finding of Fasiullah *et al.* (2010) who opined that addition of NATUZYME Plus® enzyme to diet of growing rabbits increased the feed conversion ratio due to increase in nutrient digestibility. The zero percent mortality recorded in rabbits fed control diet (T1) and diet T4 which contained 10 % MSH and 0.10 % MAXIGRAIN® compared with 22.22 % and 33.33 % percent mortality

witnessed in rabbits fed diets T2(10 % MSH and 0 % MAXIGRAIN®),T3 (20 % MSH and 0 % MAXIGRAIN®) and T5 (20 % MSH and 0.10 % MAXIGRAIN®) respectively is an indication that the diet T4 that contained 10 % melon seed husks meal plus 0.10 % MAXIGRAIN® enzyme supported better health status for the rabbits than the other treatments except the control diet.

Conclusion

The results showed that melon seed husks as replacement for maize can be successfully fed at 10 % of growing rabbits diet supplemented with 0.10 % MAXIGRAIN® enzyme without adverse or deleterious effect on growth performance. Based on the results, 10 % melon seed husks supplemented with 0.10 % MAXIGRAIN® enzyme and fed as replacement for maize is being recommended for growing rabbit diet having the best feed conversion ratio.

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Table 1 Proximate composition and energy value of experimental Diets

Ingredients	Experimental Diet (%)				
	T1	T2	T3	T4	T5
Dry Matter	90.32	90.82	91.05	90.89	90.96
Crude Protein	18.82	18.10	17.80	19.01	18.76
Crude Fibre	13.27	13.81	14.44	13.56	13.87
Ether Extract	3.08	3.02	3.46	3.02	3.43
Ash	11.73	12.87	12.31	13.51	12.47
NFE	43.42	43.02	43.04	41.79	42.43
ME (Kcals /Kg)	2766.80	2716.60	2745.00	2703.80	2756.30

Table 2. Performance of growing rabbits fed varying levels of melon seed husks meal supplemented with and without MAXIGRAIN® enzyme.

Parameters	Experimental Diets (%)					SEM
	T1	T2	T3	T4	T5	
Initial body weight (g)	942.22	941.11	930.00	943.33	927.78	6.67
Final body weight (g)	1614.44	1603.33	1578.33	1657.78	1595.00	25.31
Total weight gain (g)	672.20	662.20	648.30	714.40	667.20	30.85
Daily weight gain (g)	8.00	7.88	7.72	8.50	7.94	0.37
Total feed intake (g)	5384.00 ^{bc}	5687.00 ^{ab}	6262.70 ^a	5226.70 ^c	5479.00 ^{bc}	121.19
Daily feed intake (g)	64.10 ^{bc}	67.71 ^{ab}	74.56 ^a	62.22 ^c	65.22 ^{bc}	1.44
Feed conversion ratio	8.28	8.92	9.84	7.58	8.22	0.41
Mortality (%)	0.00 ^b	22.22 ^a	33.33 ^a	0.00 ^b	33.33 ^a	4.44

^{abc}: Means within the same row bearing different superscripts are significantly different (P<0.05);

SEM: Standard error of mean; LS: