
EFFECT OF CARROT (*DAUCUS CAROTA*) LEAVES ON GROWTH PERFORMANCE AND NUTRIENTS DIGESTIBILITY OF GROWER MONGREL RABBIT

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ABSTRACT

A total of twelve (12) mixed breeds and sexes of grower rabbits were used to investigate the effect of varying level of supplementation of carrot leaves on their growth performance and nutrients digestibility. The study was conducted at Teaching and Research Farm of Animal Science Department, Kano University of Science and Technology, Wudil. The rabbits were randomly allocated to four dietary treatments with three rabbit per replicate. The control treatment (T1) contained 0% carrot leaves while treatment T2, T3 and T4 had 5%, 10% and 15% carrot leaves dietary respectively. Clean water and feed were offered *ad libitum* to the rabbits and the record of their feed intake and growth performance were taken for 8 weeks. At the end of the 7th week, a nutrient digestibility trial was carried out. The result showed that there was no significant ($p > 0.05$) difference in final body weight, total weight gained, total feed Intake, average daily feed intake and feed conversion ratio. However, their values differed. Final body weight, total weight gained and average daily weight gained of the treatments groups were all higher than values of control group. Total feed intake and average daily feed intake were followed same trend. While feed conversion ratio showed that T4 (4.14%) had the lowest value and control group had the highest value. The digestibility of ether extract, crude fibre and ash showed significance ($p < 0.05$) difference across the treatments. In ether extract T2 (13.31%) had the highest value than the other treatments while the lowest value was observed in T1 (9.84). For Crude fibre T3 (25.72%) and T4 (25.26%) were significantly differed with T2; However, T1 was not significantly different ($p > 0.05$) from other treatments. While for ash T2 (11.79%) differed significantly from T3, T1 and T4. Hence it is concluded that carrot leaves can be supplemented up to 15% in grower rabbit diet with no detrimental effect on growth performance and nutrients digestibility.

Key words: Carrot leaves; Supplementation; Mongrel rabbit; Growth performance; Nutrient digestibility.

INTRODUCTION

There is a global cognizance on the level of shortage of animal protein supply in the tropic. Nigeria remains among the least consumers of animal protein in the world (Egbunike, 1997). Average consumption of animal protein in this country is estimated at 4.5g/head/day as against a minimum requirement of 35g/head/day recommended by the Food and Agricultural Organization of the United Nations (Atsu, 2002). The numerous attempts aimed at solving low protein intake and poverty alleviation by Nigerian government still remain a vision (Nworgu and Hammed, 2009). To meet the increasing demand for animal protein, emphasis needs to be given to non-conventional sources such as easily managed rabbits. The major constraint in animal production has been the high cost of feeding which is being compounded with the present economic depression and the fact that most of the feed ingredients such as maize, sorghum and soybean are used in preparing rabbits' diets face serious competition from man and other animals as food (Ijaiya *et al.*, 2002). The use of unconventional feed resources such as carrot leaves has become essential in animal feeding due to limited availability of conventional feeds (Bao and Chang, 1994). This low cost crop could be converted to a value added products, if processed properly and decrease the environmental load (Ezea, 2004). This study was carried out to investigate the growth performance and nutrients digestibility of grower mongrel rabbits fed grower mash supplemented with carrot leaves.

MATERIALS AND METHODS

Experimental site

The study was conducted at the Rabbitary Unit of the Teaching and Research Farm, Department of Animal Science, Kano University of Science and Technology Wudil, Kano State. The farm is located on latitude 11° 37' N and longitude 8° 58' E at an altitude of 403m above sea level. The annual rainfall ranges from 850 to 870 mm, while minimum and maximum temperatures ranges between 26 and 33°C. The relative humidity of the region is always low and ranges between 40 to 51.3% (Olofin *et al.*, 2008).

Experimental Diet, Animals and Their Management

Grower mash were supplemented with carrot (*Daucus carota*) leaves which were obtained from available carrot farms in Utai Town, Wudil Local Government Area, Kano state. The leaves were shade dried, and supplemented in experimental diets at 0% (control), 5%, 10% and 15% designated as T1, T2, T3 and T4 respectively. Twelve (12) grower rabbits of mixed breed and sexes were used; the rabbits were purchased from Wudil local government, Kano state. Prior to the commencement of the experiments, the rabbits were treated against internal and external parasites, allowed them to adapt to the farm condition for one-week period and grouped them randomly into four (4) treatments and three replications in a completely randomized design. Cleaned and disinfected feeders and drinkers were provided; Feed and water were supplied *ad-libitum*. Proper sanitary condition and ventilation were maintained throughout the experimental period. The experiment lasted for eight (8) weeks.

Determination of Growth Performance and Nutrients Digestibility

Total weight gain, feed intake and feed conversion ratio were recorded and calculated. At the end of the experiment digestibility trial were conducted, one rabbit per each treatment was kept in separate cages for faecal sample collection, the trial lasted for one week. The droppings collected from each treatment was dried and subjected to proximate analysis using analytical method of (AOAC, 2005) at Food Science and Technology Laboratory, Kano University of Science and Technology Wudil, Kano state. The digestibility of Moisture content (MC), Crude protein (CP), Ether extract (EE), Crude fibre (CF), Ash and Nitrogen free extract (NFE) were determined; Digestibility= $\frac{\text{Nutrients intake(g)} - \text{Nutrients voided(g)}}{\text{Nutrients intake}} \times 100$. All data collected were subjected to analysis of variance (ANOVA) using Statistical Analysis System (SAS). Duncan's Multiple Range Test was used to separate the means (Duncan, 1955) where treatment means were significant ($p < 0.05$).

RESULT AND DISCUSSION

The proximate composition of grower mash and carrot leaves are presented in Table 1.

Table 1. Proximate composition of grower mash and carrot leaves

Components	Grower mash (%)	Carrot leaves (%)
Moisture content	5.80	4.58
Crude protein	11.85	28.48
Crude fibre	7.95	5.51
Crude fat	4.68	2.59
Nitrogen free extract	62.24	50.91
Ash	4.48	7.14

Source: Grower mash by Chikun Feeds Nigeria limited (2023); Carrot leaves KUST- FST LAB (2023)

The growth performance of grower mongrel rabbits fed diet supplemented with varying levels of carrot leaves is depicted in Table 2. There was no significant ($p > 0.05$) difference in final body weight, total weight gained, average daily weight gained, total feed intake, average daily feed intake and feed conversion ratio across all the values obtained but their values differ. It is also observed that final body weight, total weight gained and average daily weight gained of the treatment groups were all higher than the values of the control group. The total feed intake and average daily feed intake followed same trend while feed conversion ratio showed that T4 had lowest values of 4.14% and control group had highest value of 6.03%. The higher weight gained obtained could be due to higher feed intake and more efficient utilization of nutrients by the animals. As the dietary level of supplementation of carrot leaves increased, there was a slight increase in the body weight. This could be an indication of good conversion of feed by the animals. Alawa and Amadi (1991) reported that the ability of rabbits to utilize fibrous diets may depend on the level of replacement, nature of the fibre

source, age of the rabbits and length of the adaptation period of their digestive system to the fibre. The lowest and good value of feed conversion values was observed in T4(4.14%) and the highest feed conversion ratio value was observed in T1(6.04%), this shows that T4 (4.14%) was the best diet per unit weight gain. This indicated that the lower the feed conversion ratio the better the diet in rabbit. Eustace *et al.* (2003) reported poor feed conversion ratio in his work was probably due to relative low growth rate and genetic differences.

Table 2. Growth Performance of grower mongrel rabbit fed diets supplemented with carrot leaves

Parameters	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	SEM
Initial body weight(g)	566.67	550.00	566.67	546.67	46.27
Final body weight(g)	1401.00	1468.00	1601.00	1800.00	44.22
Total weight gained(g)	3328.70	3389.80	3418.70	3864.6	298.75
ADWG(g)	19.86	21.93	25.02	27.365	1.44
Total feed intake(g)	934.33	1051.00	1233.33	1312.62	57.10
ADFI(g)	118.16	118.88	121.0630	122.09	3.20
Feed conversion ratio	6.03	5.60	4.8139	4.14	0.43

SEM= Standard error of means, T= Treatment, ADWG= Average Daily Weight Gained, ADFI= Average Daily Feed Intake.

The nutrients digestibility of grower mongrel rabbits fed diet supplemented with varying levels of carrot leaves is presented in Table 3. There were significant ($p<0.05$) differences in ether extract, crude fibre and ash across all the treatments. However, moisture content, crude protein and nitrogen free extract were not statistically ($p>0.05$) different among the treatments. . . The digestibility of nutrients obtained in this study for moisture content, crude fibre, ether extract and ash are fairly higher than the range reported by Adedire *et al.* (2012) for moisture content (1.58 - 2.58), crude fibre (16.14 - 23.83), ether extract (9.86 - 12.73) and ash (9.85 - 10.49) who fed winner rabbits with crop based residues fermented with *Rhizopus oligosporus*. The crude protein and nitrogen free extract digestibility obtained in this study was lower than the range (3.76 - 45.00 and 32.94 - 35.27 respectively) recorded by Adedire *et al.* (2012) in the same study. The differences in nutrients digestibility between the separate studies could be attributed to age disparity of the rabbits, different feeding materials used, processing methods and difference in the weather condition of the experimental sites.

Table 3 Nutrients digestibility of grower mongrel rabbit fed diet supplemented with carrot leaves.

Parameters(%)	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	SEM
MC	2.343	2.570	1.600	2.596	0.28
Crude protein	2.800	20.500	20.100	42.12	9.72
Ether extract	9.840 ^c	13.313 ^a	11.030 ^b	10.656 ^{bc}	0.29
Crude fibre	20.247 ^{ab}	18.143 ^b	25.720 ^a	25.267 ^a	1.70
NFE	32.693	34.313	31.820	32.479	0.67
Ash	10.843 ^{ab}	11.7933 ^a	9.953 ^b	11.103 ^{ab}	0.34

^{abc}: Means with different superscripts are significantly different ($p<0.05$) SEM= Standard error of means, T= Treatment, NFE= Nitrogen Free Extract, MC= Moisture content

CONCLUSION

Form the results of this research, it can be concluded that carrot leaves can be used safely in the diet of grower mongrel rabbit with no detrimental effect on their growth performance and nutrients digestibility. It can be recommended to animal nutritionist, feed millers and animal scientists to use up to 15% level of supplementation for rabbit production without any deleterious effect.

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