



## Effect of feeding regimen on growth performance, carcass attributes and economic of production of growing rabbits

\*M. A. Ayoola, O. A. Dada and M. H. Ogunsipe

Animal Production Unit, Adeyemi College of Education, Ondo, Nigeria.

### Article Information

#### Keywords

Carcass, feed efficiency, feed regimen, rabbit.

#### \*Corresponding author

M. A. Ayoola  
mayoola@yahoo.co.uk

#### Article History

Received: July 7, 2022  
Accepted: August 19, 2022  
Published: Sept. xx, 2022

#### Article can be accessed at

[www.aabrjournalaaua.org.ng](http://www.aabrjournalaaua.org.ng)

### Abstract

This experiment examined the effect of feed regimen on growth performance, carcass attributes and economic of production of growing rabbits. Thirty rabbits of mixed sexes were randomly assigned to five treatment units and replicated six times. The treatments were based on period of feed restriction for 2, 4, 6 and 8 weeks. The rabbits that were fed *ad libitum* served as the control. There was no significant difference in the growth performance and carcass attributes across the treatment units. Feed efficiency was however best in rabbits with longer period (8 weeks) of feed restriction. The result also revealed that the cost per kilogram of rabbits produced was significantly reduced with increased level of feed restriction. It could therefore be concluded that feed restriction can be adopted for growing rabbits without adverse effect on growth performance and carcass attributes. The strategy could also be key to improving feed utilization efficiency and reduction in cost of rabbit production.

## INTRODUCTION

Rabbit production has gained considerable interest in Nigeria due to the increasing prices of other conventional type of meats like beef and chevon. Rabbits are known widely for their fecundity and prolificacy (Biobaku and Dosunmu, 2003) and their ability to effectively utilize roughages (Aduku and Olukosi, 2002). It has also been observed to thrive in places where other livestock failed, but ranks close to chicken in growth rate, feed utilization and meat

quality (Agunbiade *et al.*, 2001).

Rabbit meat is better digested when compared to beef, lamb and pork (Enser *et al.*, 1996) It has also been reported to produce less uric acid during metabolism and its consumption is therefore encouraged for good health and aged people (Iyeghe-Erakpotobor, 2007). In terms of reproduction, rabbits have relatively higher litter size with a short gestation period of 30 days. A female rabbit is capable of

### How to cite this article:

M. A. Ayoola, O. A. Dada and M. H. Ogunsipe (2022). Effect of feeding regimen on growth performance, carcass attributes and economic of production of growing rabbits. *Annals of Anim. Bio. Res.*, 2(1): 44-49

supplying between 40 to 60 kits/year with an approximate of 8 to 12 kits/birth (Dalle Zotte, 2014). Consequently, commercial production of rabbit is fast becoming a specialized operation that is gaining popularity in many tropical countries, especially in West Africa (Akaeze *et al.*, 2014).

Feed constitutes the main cost in rabbit production (Yakubu *et al.*, 2007) and the control of feed consumption could be used to adjust the nutritional requirement and consequently growth performance (Yakubu *et al.*, 2007; Tumova *et al.*, 2016). Growing rabbits are usually fed *ad-libitum* in commercial farms and it is therefore important to consider alternative feeding strategies that will guarantee reduction in cost without any adverse effect on growth performance and carcass quality.

Feeding regimen or restrictions is a system of feeding in which the animals are only allowed to eat within a stipulated period of time. This system of feeding has been in existence for many years but practiced mostly by peasant farmers due to limitation in resources (Govoert *et al.*, 2002). Feed restriction can be employed for growing rabbits from one to three weeks after weaning and at different levels (Di Meo *et al.*, 2007; Tumova *et al.*, 2016) with the possibility of increasing feed efficiency and nutrient digestibility (Tumova *et al.*, 2016). Early feed restriction has also been reported to address issues like increased body fat deposition, metabolic disorders and high mortality that is associated with rabbit development at the early stage of life (Urdaneta-Rincon and Leeson, 2002; Birolo *et al.*, 2016). The digestive disorders are the main cause of mortality and morbidity in growing rabbits and

consequently resulting in great economic losses (Gidenne *et al.*, 2012). It was also reported that feed restriction during rearing of rabbits has the possibility of optimizing body development of young rabbit and improvement of productivity and longevity (Rommers *et al.*, 2001). Feed restriction could therefore be exploited in rabbit production especially during periods of inadequate supply of concentrates. It is therefore the aim of this study to examine the effect of feed regimen on the growth performance, carcass attributes and economic of production of rabbits. This could also be a promising strategy to optimize the body development of young rabbits and consequently the production of cheap animal protein (Eiben *et al.*, 2001).

## **MATERIALS AND METHODS**

The experiment was conducted at the Rabbit Unit of the Teaching and Research Farm (TRF), Adeyemi College of Education, Ondo, Ondo State. The TRF is located between latitude 5° 45' and 7° 52'N and longitude 4° 20' and 6° 05'E. The average monthly temperature is 25.7°C and annual total rainfall of 1774.5mm. The mean Relative Humidity is 75%.

### **Experimental unit and housing**

Afad commercial rabbit feed were purchased from Ibadan, Oyo state. The rabbits were housed in a large wooden wire-mesh cages that is further divided into 30 separate mini-cages that can accommodate a rabbit each. The hutch was constructed in such a way that faeces and urine can easily drop on the floor. The pen was roofed with corrugated iron sheet and adequately ventilated.

### **Management of experimental animals**

The rabbits were allowed a period of

acclimatization and managed under intensive system with appropriate vaccination and medication. The initial weights of the rabbits were taken before assigning them into experimental units. The rabbits were placed on feeding regimen for different weeks during the experimental period. The feeders and drinkers were cleaned daily and water made available at all time during the period of experimentation

### **Experimental design**

Completely randomized design was adopted for the study. Thirty weaner rabbits of mixed sexes with an average weight of 0.83kg were assigned to five experimental units and replicated six times. The treatments include: T1/control (fed *ad-libitum*), T2 (fed 6 hours for the first 14 days and then *ad-libitum* for the remaining days), T3 (6 hours of feeding for the first 28 days and *ad-libitum* for the remaining period of experiment); T4 (6 hours of feeding for 42 days and *ad-libitum* for the remaining period of experiment) and T5 (6 hours of feeding for the 56 days of experimentation)

### **Carcass analysis**

The slaughtered rabbits were properly bled and eviscerated after 56 days of experiment (at 12 weeks of age). The internal and external offals were carefully removed and the hot carcass weighed to obtain the dressed weight. This was later chilled before primal cuts were made. The internal organs were weighed separately and expressed as percentage of the live weight. Thigh, shoulder and ribs were expressed as a percentage of the dressed carcass weight.

### **Data collection and analysis**

Data were collected on feed intake, body weight, feed conversion efficiency, weights

of primal and external parts and internal offal. Data were subjected to analysis of variance (ANOVA) and means were separated using the Duncan Multiple Range Test of the Statistical Package for Social Science (SPSS) version 20.

## **RESULTS AND DISCUSSION**

### **Effect of feeding regimen on growth performance and economic of production of growing rabbits**

The result revealed that the body weight (final, weekly and daily) of the rabbits were not significantly ( $P > 0.05$ ) affected among the five treatments. Though, the feed intake was significantly highest ( $P < 0.05$ ) by rabbits on *ad libitum* feeding. This is in agreement with the result of Gidenne *et al.* (2009) who reported feed intake declination with longer period of restriction. However, feed efficiency was significantly ( $P < 0.05$ ) higher in rabbits with longer restriction period (8 weeks) compared to the control group. This implies that restricted feeding favours effective and efficient utilization of feed. This is also in agreement with the findings of Urdaneta-Rincon and Leeson (2002) who reported that feed restriction strategy improved feed efficiency while also reducing incidences of feed related problems. The cost per kilogram of rabbit ranged from N933.50 to N1419 with the control diet having the highest value. The result revealed that the cost per kilogram of rabbit produced was significantly reduced with increased level of feed restriction.

### **Effect of feeding regimen on carcass attributes of growing rabbits**

The result showed that there was no significant ( $P > 0.05$ ) difference in live shrunk and dressed carcass weight of rabbits placed on feed restriction when compared with those fed *ad libitum*. The

**Table 1:** Effect of feeding regimen on growth performance and economic of production of growing rabbits

Parameter	Treatments					SEM
	Control	14days	28days	42days	56days	
Initial weight(kg)	0.84	0.99	0.83	0.77	0.69	0.52
Final weight (kg)	1.88	2.09	1.9425	1.7987	1.95	0.60
Total weight gain (g)	1046.25	1100.00	1107.50	1026.25	1257.50	41.51
Weekly weight gain (g)	130.78	137.50	138.43	128.28	157.19	5.19
Daily weight gain (g)	18.68	19.64	19.78	18.33	22.45	0.74
Total feed consumed (g)	7285.50 <sup>b</sup>	7083.25 <sup>b</sup>	7272.75 <sup>b</sup>	6386.75 <sup>ab</sup>	5803.25 <sup>a</sup>	184.09
Weekly feed consumed (g)	910.69 <sup>b</sup>	885.40 <sup>b</sup>	909.09 <sup>b</sup>	803.34 <sup>ab</sup>	725.41 <sup>a</sup>	23.08
Daily feed consumed (g)	125.89	126.29	243.93	114.76	103.62	22.76
Feed gain ratio	7.09 <sup>b</sup>	6.59 <sup>b</sup>	6.77 <sup>b</sup>	6.23 <sup>b</sup>	4.66 <sup>a</sup>	0.27
Feed efficiency	0.1425 <sup>a</sup>	0.15 <sup>ab</sup>	0.12 <sup>a</sup>	0.16 <sup>ab</sup>	0.22 <sup>b</sup>	0.01
Price per kg of feed (N)	200.00	200.00	200.00	200.00	200.00	200.00
Cost of feed/rabbit (N)	1419.15	1318.35	1354.20	11255.55	933.50	55.84

<sup>a-b</sup> Means in the same row with different superscripts are significantly different ( $p < 0.05$ )

**Table 2:** Effect of feeding regimen on carcass characteristics of production of growing rabbits

Parameters	Treatments					SEM
	Control	14days	28days	42days	56days	
Live shrunk weight (g)	1840	2210	2500	2090	2160	0.09
Dress carcass weight (g)	942.50	1127.50	937.50	1016.00	1016.00	30.54
Thigh (%)	37.11	36.69	37.69	37.69	35.87	0.66
Shoulder (%)	26.39	27.69	27.64	26.49	26.06	0.31
Rib (%)	9.45	9.66	10.97	10.36	10.31	0.25
Loin (%)	21.25	23.19	20.35	20.93	22.43	0.43
Kidney (%)	0.35	0.51	0.49	0.51	0.59	0.03
Liver (%)	2.64	2.47	2.38	2.66	2.97	0.12
Heart (%)	0.21	0.27	0.26	0.26	0.28	0.02
Pluck (%)	0.57	0.64	0.60	0.62	0.65	0.31
Head (%)	9.06	8.61	8.45	8.48	8.95	0.13
Pelt (%)	10.13	9.99	9.39	9.72	9.56	0.16
Stomach (%)	2.56 <sup>a</sup>	3.58 <sup>b</sup>	4.00 <sup>b</sup>	3.39 <sup>a</sup>	3.53 <sup>b</sup>	0.18
Fore limbs (%)	0.66	0.66	0.62	0.67	0.73	0.03
Hind limbs (%)	1.65	1.48	1.53	1.64	1.75	0.07
Intestine (%)	13.47	16.63	17.45	15.13	14.08	0.67
Tail (%)	0.38	0.36	0.41	0.45	0.39	0.03
Stomach length (%)	17.75	17.50	18.00	17.05	16.00	0.32
Stomach width (%)	6.35	12.00	6.00	6.75	6.35	1.08
Peri-renal fat (%)	1.28	0.61	0.84	0.76	0.69	0.12

<sup>a-b</sup> Means in the same row with different superscripts are significantly different ( $p < 0.05$ )

result is in agreement with the findings of Ferreira and Carregal (2002) and Boisot *et al.* (2004) who also reported that feed restriction had no effect on dressing percentage of rabbits. The percent of loin, thigh, rib and shoulder of rabbits also showed no significant difference ( $P>0.05$ ) across the treatment groups. There was no significant difference in the liver, kidney, pluck and heart percentages of rabbits placed on restricted feeding programme compared with those on *ad libitum* feeding. There was also no significant difference in intestine full of content and peri-renal fat percentages. However, in a recent experiment with nutrias, Tumova *et al.* (2021) reported an increase in peri-renal fat percentage due to feed restriction. Among the carcass attributes, there was significant ( $P<0.05$ ) difference in stomach percentage of rabbit placed on feed restriction when compared with those on *ad libitum* feeding.

## CONCLUSION AND RECOMMENDATION

It can be concluded that feed restriction schedule of 6 hours daily for up to 8 weeks had no significant effect on growth performance and carcass attributes of rabbits when compared with those on control. Increased level of feed restriction however has the potential to reduce the cost per kilogram of rabbit. It is recommended that farmers should key into the practice of feed restriction during the period of scarcity in order to reduce the cost of production.

**Conflict of interest:** Authors indicate that there is no any actual or potential conflict of interest that could inappropriately or possibly influence this work after publication.

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