Growth performance, haematology and cost benefit of growing rabbits reared on different feed access times and restriction durations

Obasa, O.A.[1*], Adeyemi, O.A.[1], Akinola, O.S.[1], Sobayo, R.A.[2], Njoku, C.P.[1] and Olaifa, R.O.[1]

[1]Department of Animal Production and Health, [2]Department of Animal Nutrition, Federal University of Agriculture, Abeokuta, Nigeria.

*Corresponding author: obasa.oreoluwa@yahoo.com

Abstract

Sixty growing rabbits of mixed breeds and sexes were used for 10 wk in a 4 x 3 factorial experimental design to test for the effect of different feed access times (2, 4, 6 and 24 h) and different restriction durations (2, 4 and 6 wk) on the performance, haematological parameters and cost benefits of growing rabbits. Data obtained were subject to a 2–way analysis of variance. Results showed significantly higher ($p<0.05$) final weight in rabbits maintained on 24-h feed access time (1875.4g) and 6-h feed access time (1822.0g) for 2-wk restriction duration, 6-h feed access time for 4-wk restriction duration (1821.0g) and 4-h feed access time for 2-wk restriction duration (1828.0g). Growing rabbits on 24-h feed access time (control) recorded a higher ($p<0.05$) feed intake when compared with other treatments. Feed conversion ratio and mortality were not significantly affected ($p>0.05$) across the feed access time and restriction duration. White blood cell was higher in growing rabbits on 2-h feed access time for 6-wk duration of restriction while all other parameters measured for haematology were not significantly affected by the feed access time and restriction duration. Total cost of feed consumed was highest in growing rabbits maintained on 24-h feed access time. Cost of feed per kg weight gain was not significantly influenced across the feed access times and the restriction durations. It was concluded that for a reduced cost of feeding without an adverse effect on the performance and haematological profile, growing rabbits should be raised on not less than 4-h feed access time for 2-wk restriction duration.

Key words: feed access time, feed restriction, haematology and cost

Introduction

Interest in rabbit production in Nigeria has been on the increase in recent years. Rabbit occupies a unique niche in that it is a mini livestock that is easy to manage, highly prolific and has a short generation interval. The cost of feeding rabbits is however very high, a condition that also prevails for other livestock species in Nigeria (Adeyemi *et al*., 2008). Currently, there has been an increased interest in studying feed restriction in rabbits as a means of reducing the cost of production (Adeyemi *et al.*, 2008). Growing rabbits usually have unlimited access to the feed and eat *ad libitum*. In a restricted feeding system, either the access of the animals to the feed is limited, or a fixed amount of feed is given. Feeding strategy in growing rabbits could be used to produce animals with maximum lean body mass, low feed conversion ratio, and best meat quality. The early life fast growth rate is accompanied by a number of problems, namely increased body fat deposition, high incidence of metabolic disorders, high mortality, and high incidence

of skeletal diseases (Ebeid *et al*., 2012). In the growing rabbits, an early feed restriction applied around post-weaning age could be of interest to improve feed efficiency (Yakubu *et al.,* 2007; Gidenne *et al.,* 2012), induce compensatory growth (Tůmová *et al.,* 2002; Foubert *et al.,* 2008), reduce carcass fat deposition (Tůmová *et al.,* 2004), improve digestibility of nutrients during the restricted feeding period (Tůmová *et al.,* 2004; Di Meo *et al.,* 2007).

Restricted rabbits are reported to have improved feed efficiency (Maertens and Peeters, 1988; Perrier and Ouhayoun, 1996). Improved digestibility of nutrients at restricted feeding period was found in rabbits by Ledin (1984a). Limiting feed intake depresses growth during the period of restriction, but reduced growth can be later compensated by realimentation. This phenomenon of accelerated growth following a period of feed restriction is termed "compensatory growth" (Tumova *et al*., 2002). However, response to compensatory growth depends on the duration of feed restriction. Prolonged feed restriction diminishes the potential of compensatory growth (Leeson and Summers, 2005). In a bid to reduce the production cost without negatively compromising the performance and health status of the animals, this study was therefore aimed at identifying the time of access to feed and the restriction duration that will give the best growth performance, haematological profile and feed cost benefit.

Materials and Methods

Experimental site

The experiment was carried out at the Directorate of University Farms of the Federal University of Agriculture, Abeokuta, Ogun State, Nigeria. The location lies within the rain forest vegetation zone of South West Nigeria with a mean rainfall of 1037 mm, a temperature of 34.7^{o}C and a relative humidity of 82%.

Experimental rabbits and management

A total of 60 unsexed rabbits of mixed breeds with weight ranging between 698 – 720 g were used for this experiment which lasted for 70 d. Prior to the arrival of the rabbits, the cages, drinkers and feeders were thoroughly cleaned and disinfected. At the beginning of the experiment the rabbits were randomly distributed into 12 treatment combinations with 5 replicates with 1 rabbit per replicate. Daily routine management practices were carried out such as supply of clean water and feed, observing for sick rabbits, checking for mortalities and appropriate record keeping. In addition 100 g of freshly cut *Tridax pucumbens* were provided to each rabbit weekly.

Experimental diet

The composition of the diet is shown in Table I. The diet was based on feed composition used for growing rabbits on the Directorate of University Farm of the Federal University of Agriculture Abeokuta, which was developed in line with the recommendations of Aduku (2004) and Merck (2011). The feed was given in mash form. Four levels of feed access time (24 h *ad libitum*, 6 h, 4 h and 2 h) and three restriction durations of 2, 4 and 6 wk were used.

Table I. Composition of the experimental diet

Ingrdient	%
Maize	47.50
Soyabeans meal	8.00
Wheat offal	31.00
Groundnut cake	10.00
Bone meal	3.00
Salt	0.25
Vitamins/ Premix*	0.25
Total	100.00
Determined analysis	
Dry matter (%)	89.45
Crude protein (%)	18.74
Crude fibre (%)	15.68
Ether extract (%)	4.48
Energy (KJ/kg)	10.93

*Composition per kg diet. Vitamin A. 4000000 IU, Vitamin D. 800000 IU, Vitamin E 40000mg, Vitamin K3 800mg Vitamin B1 1000mg Vitamin B2 6000mg, Vitamin B6 5000mg, Vitamin B12 25mg, Niacin 6000mg, Pantothenic acid 20000mg, Folic acid 200mg, Biotin 8mg, Manganese 300000mg, Iron 80000mg, Zinc 20000mg, Cobalt 80mg, Iodine 400mg, Selenium 40mg, Choline 800000mg.

Experimental design

The experiment was arranged in a 4 x 3 factorial layout, consisting of four levels of feed access times (2, 4, 6 and 24 h) and three durations of restriction (2, 4 and 6 wk).

Data collection and growth performance indices

The rabbits were weighed per replicate at the start of the experiment and subsequently on a weekly basis. Weight gain was taken by calculating the difference between the final body weight and previous body weight. Feed intake was recorded weekly for each treatment per replicate while left-over feed was subtracted from the total feed given to the rabbits in order to determine feed intake. Feed:gain ratio was calculated as feed intake per g of body weight gain. The total number of dead rabbits per treatment during the experimental trial was recorded and expressed as percentage (%) of total number of rabbits alive per treatment at the start of the experiment. Proximate analysis of the compounded ration was analyzed according to the method of AOAC (2005).

Evaluation of haematological parameters

At the end of the study, 2.5ml of blood was collected from three rabbits per treatment. This was done through throat slitting into bottles containing ethylene diamine tetra acetate (EDTA) for haematological parameters (packed cell volume, hemoglobin concentration, white blood cell and red blood cell count) following standard procedure described by Davice and Lewis (1991).

Cost - benefit determination

The prevailing market prices of the feed ingredients at the time of the experiment were used to estimate the unit cost of the experimental diet. Feed cost per kilogramme and cost per kilogramme of weight gain were calculated.

Statistical analysis

All data collected from the 4 x 3 factorial design study were subject to a 2-way ANOVA analysis using SAS (2005). Significantly ($p<0.05$) different means were separated using Duncan's Multiple Range Test of the same statistical package.

Results and Discussion

Table 2 shows the main effect of feed access time and restriction duration on the performance of growing rabbits. Final weight, weight gain and feed intake was significantly ($p < 0.05$) influenced by the feed access time and the duration of restriction. Growing rabbits on 24-h and 6-h feed access time had higher ($p < 0.05$) final weight and weight gain. The favourable performance of growing rabbits on 6-h feed access time when compared with the *ad libitum* feeding (24-h feed access time) could be attributed to the restriction strategy which favoured proper compensatory growth. While the depression observed in the performance of the other restricted groups (2- and 4-h feed access time) could be attributed to the intensity or severity of the restriction which did not favour compensatory growth after the restriction period. Previous works by Yakubu *et al*. (2007), Gidenne *et al*. (2012) and Omoseibi *et al*. (2014) showed that the severity and length of feed restriction affected compensatory growth. It was also observed that the intensity of the duration of restriction affected the performance of growing rabbits.

From the present study, performance reduced as the duration of restriction increased. Total feed intake and daily feed intake at the end of the trial was significantly lower in restricted rabbit groups when compared to the *ad libitum* fed group. This present finding is in agreement with the reports of Perrier and Ouhayoun (1996) and Tumova *et al.*, (2003) who reported that feed intake in restricted fed rabbits was lower when compared to the *ad libitum* fed group. The feed:gain ratio was not significantly ($p>0.05$) influenced by the feed access time and restriction duration. This result supports the findings of Yakubu *et al*.(2007) who reported that no significant difference in feed:gain ratio between *ad libitum* fed and restricted fed rabbits. The similar values recorded in feed: gain between the *ad libitum* fed groups and the restricted groups could be attributed to a better nutrient digestibility of the rabbits in the restricted groups. Perrier and Ouhayoun (1996) and Gidenne (1993) reported improved digestibility of nutrients and feed efficiency in rabbits at restricted feeding period. Feed access time and the duration of restriction had no influence on mortality percentage. This result is in consonance with the works of Osman (1991), Gidenne *et al*. (2003), Yakubu *et al*. (2007), Pinheiro *et al*. (2012) and Gidenne *et al*. (2010).

Table 2: Main effects of feed access time and duration of restriction on the performance of growing rabbits

Parameters	Feed access time (h)					Duration (wk)			
	2	4	6	24	SEM	2	4	6	SEM
Initial weight (g)	708.33	698.97	711.87	719.72	26.71	709.89	709.63	709.65	22.97
Final weight (g)	1622.72^{b}	1724.66^{ab}	1800.33^{a}	1855.36^{a}	47.72	1801.54^{a}	1766.5^{ab}	1684.27^{b}	44.19
Weight gain (g)	914.38^{b}	1025.69^{ab}	1088.46^{a}	1135.63^{a}	40.88	1091.65^{a}	1056.86^{ab}	974.61^{b}	40.21
Total feed intake (g)	3609.47^{c}	3953.73^{b}	4138.70^{b}	4652.69^{a}	118.93	4325.15^{a}	4016.20^{b}	3924.59^{b}	127.83
Daily weight gain (g/day)	13.06^{b}	14.65^{ab}	15.55^{a}	16.22^{a}	0.62	15.59^{a}	15.09^{ab}	13.92^{b}	0.57
Daily feed intake (g/day)	60.50^{c}	66.18^{b}	68.97^{b}	74.04^{a}	1.94	72.34^{a}	65.76^{b}	64.18^{b}	1.85
FCR[1]	4.03	3.95	3.88	4.14	0.16	4.07	4.05	3.88	0.14
Mortality (%)	7.14	13.33	0.00	0.00	5.12	5.00	5.26	5.00	5.08

^{abc}Means in the same row not sharing common superscript are significantly different ($p<0.05$)

[1]FCR.: Feed conversion ratio

Table 3 shows the interaction between feed access time and duration of restriction. This study showed that the body weight gain of growing rabbits and feed intake were progressively reduced according to the intensity of the feed access time and duration of restriction. However, feed allocation regardless of the severity of the feed restriction still allowed for some growth and maintenance. It was observed that growing rabbits on 4-h feed access time for 2-wk restriction duration, 6-h feed access time for 2-wk duration and 6-h feed access time for 4-wk duration recorded similar performances and competed favourably with rabbits on 24-h feed access time (*ad libitum*). The performance recorded by rabbits in these groups in relation to the *ad libitum* fed group indicates that the intensity and duration of restriction they were exposed to could still permit a complete compensatory growth after the restriction phase. This result is in agreement with the work of Tumova *et al.* (2003) who reported a compensatory growth and increased weight gain in earlier restricted rabbits. However, the inability of the other restricted groups to catch-up with the *ad libitum* fed rabbits might be due to the intensity and duration of the restriction which did not allow them to compensate for the weight they lost during the restriction period. Studies have shown that the longer the period of under nutrition, the more difficult it is for rabbits to compensate for reduction in live weight (Yakubu *et al*., 2007). The feed: gain ratio and the mortality were not influenced by the interaction between the feed access time and the restriction duration. This result is consistent with the works of Yakubu *et al.* (2007) and Lumturi *et al*. (2012) who reported no significant differences in the values obtained for feed: ratio and mortality.

Table 3: Interactions of of feed access time and duration of restriction on the performance of growing rabbits

Feed access time	2 h			4 h			6 h			24 h			
Duration of restriction	2 wk	4 wk	6 wk	2 wk	4 wk	6 wk	2 wk	4 wk	6 wk	2 wk	4 wk	6 wk	SEM
Parameter													
Initial weight (g)	712.382	710.35	702.27	696.23	700.39	700.29	712.51	704.44	718.66	718.66	723.34	717.40	49.20
Final weight (g)	1696.2^{ab}	1696.0^{ab}	1476.0^{b}	1828.0^{a}	1668.0^{ab}	1678.0^{ab}	1822.0^{a}	1821.0^{a}	1698.0^{ab}	1885.10^{a}	1881.0^{a}	1860.0^{a}	74.36
Weight gain (g)	983.8^{ab}	985.7^{ab}	773.70^{b}	1131.8^{a}	967.6^{ab}	977.7^{ab}	1109.50^{a}	1176.6^{a}	979.3^{ab}	1141.6^{a}	1097.7^{a}	1167.7^{a}	69.55
TFI [1] (g)	4140.3^{abcd}	3605.7^{de}	3144.8^{e}	4375.10^{ab}	3661.3^{bd}	3877.6^{bcd}	4195.0^{ab}	4161.8^{abc}	4059.3^{bcd}	4652.7^{a}	4652.90^{a}	4652.80^{a}	183.70
ADWG[2] (g/day)	14.05^{ab}	14.08^{ab}	11.05^{b}	16.16^{a}	13.82^{ab}	13.96^{ab}	15.85^{a}	16.80^{a}	13.99^{ab}	16.30^{a}	15.68^{a}	16.68^{a}	0.95
Feed: gain ratio	4.25	3.78	4.07	4.03	3.84	3.97	3.84	3.62	4.19	4.08	4.28	4.06	0.24
Mortality (%)	20	0	0	0	20	20	0	0	0	0	0	0	5

^{abc} Means in the same row without common letter are significantly different at $p<0.05$

[1]TFI: Total feed intake

[2]ADWG: Average daily weight gain

Table 4 shows the main effect of feed access time and duration of restriction on the haematological profile of growing rabbits. Feed access time had significant ($p<0.05$) effect on the values obtained for packed cell volume. These values increased significantly as the feed access time increased with rabbits on 2-h feed access time recording the lowest value (35.88%) while rabbits on 24-h feed access time obtained the highest value (46.55%). However these values were within the normal range recommended for growing rabbits by Tumova *et al*. (2007). According to Isaac *et al*. (2013) packed cell volume is involved in the transport of oxygen and absorbed nutrients. This implies that reducing the feed access time reduces significantly, the transportation of oxygen and absorbed nutrient in the blood. Furthermore, Chineke *et al*. (2006) reported that packed cell volume is significant in the diagnosis of anaemia and also serves as a useful index of the bone marrow capacity to produce red blood cells in mammals. Therefore, the downward trend observed in values obtained for the packed cell volume as the time access reduced could indicate that an anaemic condition is induced as the feed access time was reduced. This result agrees with the work of El–Monty (1991) who reported that feed restriction significantly reduced packed cell volume. The duration however, had no significant effect on the packed cell volume.

According to Isaac *et al.* (2013) red blood cell is involved in the transport of oxygen and carbon dioxide in the body. Thus, a reduced red blood cell count implies a reduction in the level of oxygen that would be carried to the tissues as well as the level of carbon dioxide returned to the lungs (Ugwuene, 2011; Soetan *et al.,* 2013; Isaac *et al.,* 2013). According to the result of this present study, values obtained for red blood cell and haemoglobin were not significantly affected by the feed access time and the duration of restriction. However, values are within the range of red blood cell and haemoglobin for growing rabbits recommended by Tumova *et al.* (2007). This result is in consonance with the report of Ebeid *et al*. (2012) who reported no significant difference in values for red blood cell and haemoglobin between rabbits fed *ad libitum* and those that had feed restriction. The duration of restriction had a significant effect on the white blood cell which interestingly increased as the duration increased. This result suggests an increase in disease resistance as duration increases or a need to increase the production of defensive mechanism that fights diseases as the duration increased.

Table 4: Main effect of feed access time and duration of restriction on the haematological parameters of growing rabbits

Parameter	Feed access time					Duration of restriction			
	2 h	4 h	6 h	24 h	SEM[1]	2 wk	4 wk	6 wk	SEM[1]
Packed cell volume (%)	35.88[b]	43.66[ab]	42.22[ab]	46.55[a]	2.29	43.72	38.66	42.22	2.59
Haemoglobin (g/dL)	11.56	13.55	13.52	14.73	0.63	13.63	12.60	13.51	0.71
Red blood Cell ($x10^2$)	5.52	5.88	5.97	6.47	0.30	6.16	5.46	6.07	0.29
White blood cell ($cumm^2x10^3$)	10.11	9.04	9.54	9.05	0.48	8.54[b]	9.50[ab]	10.20[a]	0.37
Lymphocytes	65.11	62.33	63.88	65.00	1.74	63.83	64.44	64.22	1.64
Neutrophils	33.66	36.66	34.44	33.33	1.63	34.55	34.00	35.00	1.57
Eosinophils	0.33	0.55	0.55	0.55	0.22	0.55	0.66	0.22	0.18
Basophils	0.55	0.33	0.44	0.55	0.30	0.55	0.44	0.33	0.23
Monocytes	0.33	0.33	0.66	0.55	0.27	0.61	0.44	0.22	0.23
N: L[2]	0.52	0.60	0.55	0.52	0.04	0.55	0.54	0.56	0.26

[abc]Means in the same row not sharing common superscript are significantly different ($p<0.05$)
[1]SEM: Standard error of mean
[2]Neutrophil lymphocyte ratio,

Table 5 shows the interaction of feed access time and restriction duration on the haematological profile of growing rabbits. The interaction between feed access time and duration of restriction did not have significant ($p>0.05$) effect on the packed cell volume, haemoglobin, lymphocyte, neutrophil, eosinophil, basophil, neutrophil lymphocyte ratio. However, significant ($p<0.05$) difference was obtained for white blood cell count. All these values are within the range recommended by Ebeid *et al*. (2007). The non-significant difference observed in values for haemoglobin and red blood cell according to Isaac *et al.* (2013) indicates a normal transportation of oxygen and absorbed nutrient in the blood. The significant difference observed in the white blood cell with growing rabbits on the 2-h feed access time for 6-wk restriction duration recording the highest value implies that a more severe restriction strategy could increase the need for growing rabbits to produce defensive mechanism that fights diseases. The non-significant differences obtained for lymphocytes, neutrophils, eosinophils, basophils and monocyte imply that the interaction of feed access time and the duration of restriction did not adversely affect the production of antibodies.

Table 5: Interaction of feed access time and duration of reriction on haematological parameters of growing rabbits

Feed access time		2 h			4 h			6 h			24 h		
Duration of restriction	2 wk	4 wk	6 wk	2 wk	4 wk	6 wk	2 wk	4 wk	6 wk	2 wk	4 wk	6 wk	SEM[1]
Parameter													
Packed cell volume (%)	36.33	34.33	37.00	43.00	43.33	44.66	43.33	38.33	45.00	47.33	44.66	47.66	3.78
Haemoglobin (g/dL)	11.56	11.26	11.86	12.56	14.13	13.96	13.46	12.40	14.70	14.73	14.30	15.16	0.96
Red blood Cell ($x10^2$)	5.40	5.53	5.66	6.26	5.36	6.03	5.86	5.53	6.53	6.53	5.80	7.10	4.43
WBC[2] ($cumm^2x10^3$)	10.36^{ab}	8.93^{ab}	11.03^{a}	8.96^{ab}	8.60^{ab}	9.56^{ab}	10.53^{ab}	10.00^{ab}	8.10^{b}	8.50^{ab}	8.76^{ab}	10.40^{ab}	0.51
Lymphocyte	63.66	65.33	66.33	63.00	62.33	61.66	61.33	65.66	64.66	67.33	59.33	68.33	2.37
Neutrophil	35.00	33.33	32.66	36.33	35.66	38.00	36.00	33.0	34.33	31.66	39.00	29.33	1.89
Eosinophil	0.00	0.66	0.33	0.66	1.00	0.00	1.00	0.33	0.33	0.66	0.66	0.33	0.54
Basophil	0.66	0.33	0.66	0.66	0.00	0.33	0.33	1.00	0.00	0.00	1.00	0.66	0.025
Monocyte	0.66	0.33	0.00	0.00	1.00	0.00	1.33	0.00	0.66	0.33	0.00	1.33	0.24
[3]N:L	0.55	0.51	0.50	0.59	0.59	0.62	0.59	0.51	0.54	0.47	0.66	0.43	0.12

[abc]Means in the same row by factor with different superscript differ significantly ($p<0.05$)
[1]SEM: Standard error of mean
[2]WBC.: White blood cell
[3]N:L: Neutrophil lymphocyte ratio

Table 6 shows the effect of feed access time and restriction duration on the cost – benefit ratio of growing rabbits. The total cost of feed per kg weight gain over the entire experimental period was not significantly influenced for both factors of feed access time and duration of restriction. However rabbits on the 6-h feed access time showed a better economic efficiency. The superiority of rabbits on the 6-h feed access time compared to the rabbits on 24-h feed access time arose from the fact that although, weight gain was not significant between the two treatments the amount required to feed rabbits on 6-h feed access time was however lower than the 24-hs feed access time. Maintaining rabbits on 6-h feed access time may therefore be a useful tool in saving feed cost and reducing the cost of production. This result corroborates the results of Adeyemi *et al.* (2013)) who reported better economic efficiency in rabbits restricted 80% of the *ad libitum* when compared with the *ad libitum* fed group.

Table 6. Effect of feed access time and duration of restriction on the cost – benefit ratio of raising growing rabbits

Parameters	Feed access time					Duration of restriction			
	2 h	4 h	6 h	24 h	SEM	2 wk	4 wk	6 wk	SEM
Total feed intake (g)	3609.47^{c}	3953.73^{b}	4138.70^{b}	4652.69^{a}	118.93	4325.15^{a}	4016.20^{b}	3924.59^{b}	127.83
Cost of feed /kg (N)	80.06	80.06	80.06	80.06	-	80.06	80.06	80.06	-
Total cost of feed consumed (Naira)	288.98^{c}	313.47^{bc}	331.34^{b}	372.49^{a}	8.98	346.271^{a}	321.54^{b}	314.20^{b}	10.05
Total cost of feed/ kg weight gain (Naira)	331.36	321.26	311.14	310.90	21.54	322.94	307.96	325.09	10.99

^{abc}Means in the same row by factor with different superscript differ significantly ($p<0.05$)
SEM: Standard error of Mean

Table 7: interaction of feed access time and duration of restriction on the cost – benefit ratio of raising growing rabbits

Time access feeding		2h			4h			6h			24h		
Duration	2wk	4wk	6wk	2wk	4wk	6wk	2wk	4wk	6wk	2wk	4wk	6wk	SEM
Parameter													
Total feed intake (g)	4140.3^{abcd}	3605.7^{de}	3144.8^{e}	4375.10^{ab}	3661.3^{bd}	3877.6^{bcd}	4195.0^{ab}	4161.8^{abc}	4059.3^{bcd}	4652.7^{a}	4652.90^{a}	4652.80^{a}	183.70
Cost of feed/ kg (N)	80.06	80.06	80.06	80.06	80.06	80.06	80.06	80.06	80.06	80.06	80.06	80.06	-
Total cost of feed consumed (N)	326.48^{bcd}	288.69^{de}	251.77^{e}	350.27^{ab}	283.47^{de}	306.68^{bcd}	335.85^{abc}	333.19^{abc}	324.99^{abcd}	372.49^{a}	372.51^{a}	372.50^{a}	13.61
Cost of feed/ weight gain (N)	334.82	302.69	326.26	322.71	295.41	314.58	307.53	290.16	335.71	326.69	343.59	323.79	21.95

^{a,b,c}: Means in the same row by factor with different superscript differ significantly ($p<0.05$)
SEM: Standard error of Mean

Table 7 shows the interaction of feed access time and restriction duration on the cost – benefit ratio of raising growing rabbits. Total cost of feed consumed at the end of the experimental trial was significantly ($p < 0.05$) influenced by the interaction of feed access time and restriction duration. Growing rabbits on 24–h feed access time (ad libitum fed) recorded the highest value, Growing rabbits on 4-h feed access time for 2 wks restriction duration and 6-h feed access time for 2 and 4 wks restriction duration which had similar growth performances with the ad libitum fed rabbits recorded lower values for the cost of feed consumed. The lower values obtained in cost of feed consumed by growing rabbits on 4-h feed access time for 2 wks restriction duration and 6-h feed access time for 2 and 4 wks restriction duration suggests that managing growing rabbits on these feed access times and restriction durations will help reduce significantly the cost of feeding and ultimately reduce the cost of production.

Conclusion

From this study, it can be concluded that for a reduced body fat deposition and reduced cost of feeding without adversely affecting the performance and blood profile, growing rabbits should be raised on not less than 4-h feed access time for 2-wk restriction duration.

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