Egyptian Journal of Rabbit Science, 27 (2): 359- 375(2017)

EFFECT OF FEED RESTRICTION SYSTEM ON PERFORMANCE, CARCASS TRAITS, MEAT QUALITY AND BLOOD PARAMETERS OF GROWING RABBITS

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The objective of the present study to investigate the effect of feed restriction system on growing performance, carcass traits, meat quality and blood parameters of growing New Zealand White (NZW) rabbits, during experimental periods from 5 to 13 weeks of age. A total number of 90 NZW rabbits (male and female ratio 1:1) of weaning aged 5 weeks (about 777.45±10.38g body weight) were randomly divided into five experimental groups (n=18 each), the first group was fed ad-libitum as control, the second group was fed restriction a mount of feed for first 2 weeks only, the third group was fed restriction for 4 weeks only, the fourth group was fed restriction 6 weeks only and the fifth group was fed restriction for all experimental period (8weeks).

Results showed a significant (P< 0.01) increased of live body weight, weight gain and feed intake in group 1 (ad libitum) as compared with other restricted groups. No significant effect was observed in health status or mortality percentage of rabbits during experimental periods.

Renal fat was significantly (P< 0.05) reduced in rabbits restricted as compared with control group. The meat pH was not affected by restriction feed groups. On the other hand blood parameters studied were not significantly influenced by the treatment.

Conclusively, *it could be concluded that, feed restriction groups of growing rabbits at different ages studied with various mounts can be adopted because it does not interfere negatively in the performance, meat quality and blood parameters. Also it's beneficial in improvement of feed and economic efficiencies.*

Key words: Feed restriction, performance, carcass traits, meat quality, blood parameters, growing rabbits.

Feeding is the main cost in rabbit production, so the control of feed intake could be used to adjust the diet and nutritional requirements to manage the growth performance (Yakubu *et al.,* 2007; Bergaoui *et al.,* 2008).

In commercial farms, growing rabbits are usually fed *ad libitum* (Maertens, 2009). However, feeding can be restricted during the post-weaning period to improve feed efficiency and standardize growth curves in rabbits with a different feed ingestion level (Ouhayoun *et al*., 1986; Cavani *et al*., 1991) or to control the appearance of digestive disorders (Gidenne *et al*., 2009 and 2011).

The application of feed restriction during fattening period of rabbits, without compromising too much the growth, may be a good strategy for rabbit management, because it may decrease the feeding cost and reduce the health risk (Gidenne *et al.,* 2003; Foubert *et al.,* 2008). However, inadequate and high cost of feed ingredients brought about mainly by the stiff competition between man and monogastric animals such as rabbits and poultry for grains is the major constraint to rabbit production (Agunbiade *et al.,* 2002).

The early-life fast growth rate in rabbit 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. In the growing rabbits, an early feed restriction applied around post-weaning age could be of interest to improve feed efficiency (Tumova *et al.,* 2002; Tumova *et al.,* 2003; Yakubu *et al.,* 2007; Gidenne *et al.,* 2009 and Gidenne *et al.,* 2012), to induce compensatory growth (Tumova *et al.,* 2002; Foubert *et al.,* 2008), to reduce carcass fat deposition (Tumova *et al.,* 2004), to improve digestibility of nutrients during the restricted feeding period (Tumova *et al.,* 2004 and Di Meo *et al.,* 2007).

Feed restriction suppresses growth during the restriction period, but the growth reduced can be compensated with greater future intake (Govaerts *et al.,* 2000). Nevertheless, feed restriction can be used at different periods (usually from one to three weeks after weaning) or at different levels (restriction percentage in order to free intake) (Di Meo *et al.,* 2007).

In fact, digestive disorders are the main cause of morbidity and mortality in growing rabbits which are responsible for important economic losses in industrial rabbit farms (Ebeid *et al.,* 2012). Therefore, early feed restriction could be used a useful tool to improve the biological and economic performance (Tumova *et al.,* 2007), which consequently involved in reducing the costs of production (Yakubu *et al.,* 2007).

Carcass traits of rabbits are not influenced by feed restriction (Ledin, 1984). Tumova *et al.,* (2003) found that feed restriction did not affect on body weight or carcass yield for rabbits received restricted feed for three weeks which had lower body weight than the groups restricted for one or two weeks, although yield was not influenced by the feeding regimen.

The gastrointestinal tract is longer in the restricted rabbits, which might explain in part reduction in the carcass yield (Cantier *et al.,* 1969). However, in the growing rabbits, an early feed restriction applied around post-weaning age could be of interest to reduce carcass fat deposition (Tumova *et al.,* 2004).

According to Eiben *et al.,* (2001) and Rommers *et al.,* (2001), feed restriction during rearing of rabbit, followed by a short flushing and delay of first insemination to an older age, seems to present a promising strategy for optimizing body development of young and improving their productivity and longevity.

Recently, Birolo *et al.,* (2016) reported that restriction program, a mild feed restriction (93% of *ad libitum*) during the first period improved rabbit health status and reduced environmental pollution in the fattening sector without impairing growth performance, slaughter results and carcass traits.

Since feed restriction had positive impacts in growing rabbits, the objective of the present study was to investigate the effect of feed restriction on growth performance, carcass traits, chemical analysis of meat, some blood parameters and economical efficiency of growing NZW rabbits, during experimental periods from 5 to 13 weeks of age.

MATERIALS AND METHODS

This experiment was carried out in the Rabbitry farm of Poultry Department, Faculty of Agriculture, Zagazig University, Zagazig, Egypt, during two months of April and May, 2016, which extended for eight weeks ago.

Animals and experimental design:

A total of 90 New Zealand White (NZW) rabbits (male and female ratio 1:1) of weaning aged (5 weeks) and about 777.45±10.38g body weight were housed in commercial wired cages (3 rabbits per cage) with floor space of 0.12 m^2/rabbit under 16 hrs photoperiod daily. Rabbits were randomly divided into five experimental groups (n=18 each), in 6 replicates each of 3 rabbits.

The first group was fed *ad-libitum,* (as control), the second group was fed restricted feed with 50g/d/rabbit for two weeks only, the third group was fed restricted feed with 50g/d/rabbit for two weeks and 75g/d/rabbit for two weeks, the fourth group was fed restricted feed with 50g/d/rabbit, 75g/d/rabbit and 100g/d/rabbit for two weeks each, respectively, while the fifth group was fed restricted feed with 50g/d/rabbit, 75g/d/rabbit, 100g/d/rabbit and 125g/d/rabbit for two weeks each, respectively, as shown in Table 1.The rabbit groups were fattened until 13 weeks of age.

Table 1. Experimental design:

Age / Treatment	**5-7 Weeks**	**7-9 Weeks**	**9-11 Weeks**	**11-13 Weeks**
T1	***ad libitum during the experimental periods***			
T2	50g/d/ rabbit	*ad libitum*	*ad libitum*	*ad libitum*
T3	50g/d/rabbit	75g/d/rabbit	*ad libitum*	*ad libitum*
T4	50g/d/rabbit	75g/d/rabbit	100g/d/rabbit	*ad libitum*
T5	50g/d/rabbit	75g/d/rabbit	100g/d/rabbit	125g/d/rabbit

Housing, feeding and environment:

Animals were housed in galvanized wired cages batteries (60x60x40cm), in a good natural ventilation through the windows (open housing system), while temperatures ranged between 22 to 35ºC and humidity ranged between 50 to 65% during experimental periods. A sixteen hours photoperiod was used. Fresh water was available *ad libitum*. The rabbits were fattened until 91 days of age. Cages were supplied with feeders and stainless steel nipples for feeding and drinking. All rabbits were observed daily, healthy and clinically free from internal and external parasites, vaccinated against common diseases and kept under the same managerial and hygienic conditions.

The experimental diets were formulated to be iso-nitrogenous (16.75% CP) and iso-caloric (2552 kcal DE/kg diet). Rabbits were fed pelleted commercial diets formulated to meet recommended nutrient requirements of rabbits according to N.R.C (1977), and the chemical composition of the basal diet was analyzed according to A.O.A.C (1995) as shown in Table 2.

Measurements:

Initial body weight, body weights, feed intake, body weight gain and mortality rate were recorded during experimental periods. Weighing was carried out before offering the morning meal. Total body weight gain, daily weight gain and feed conversion were calculated.

At the end of experiment (13 weeks of age), six rabbits from each group (one rabbit from each replicate) after being fasted for 12 hours

Table 2: Composition and Chemical analysis of the experimental diet.

Ingredients	**Percentages**
Clover hey (13% CP)	24.30
Wheat bran	29.00
Soybean meal, (44%CP)	14.00
Yellow corn	7.00
Barley grain	20.20
Molasses	3.00
Di-calcium phosphate	1.00
Limestone	0.70
Mineral-vitamin premix*	0.30
Salt (NaCl)	0.30
DL-methionine	0.20
Total	**100.00**
Chemical composition*	
Crude protein, %	16.75
Digestible energy (K.Cal/Kg)	2552
Crude fiber,%	12.30
Ether extract, %	3.05
Calcium,%	0.95
Total phosphorus, %	0.68
Methionine, %	0.46
Lysine, %	0.70
Price/ton diet, L.E. ***	**2750.00**

*** One kilogram of premix contained:** Vit A 6000, 000 IU; Vit D_3, 300, 000 IU; Vit. E. 1000 mg; Vit k_3 2000 mg; Vit B_1, 1000 mg ; Vit B_2, 1000 mg ; Vit B_6, 1000 g; Vit B_{12}, 10 mg; Pantothenic acid, 10000 mg; Niacin, 200 mg; Folic acid, 1000 mg; Biotin, 50 mg; Choline Chloride, 500 mg, Fe, 30000 mg; Mn, 3000 mg; Cu, 2000 mg; I, 100 mg; Co, 100 mg; Se, 100 mg and Zn, 450 mg.

** Analyzed according to **A.O.A.C (1995).**

*** Calculated according to the price of feed ingredients when the experiment was started.

randomly chosen for slaughter test and chemical analysis of it's meat. Slaughter procedure and carcass quality were carried out as described by Blasco and Ouhayoumn (1996). They were then slaughtered by severing the carotid arteries and jugular veins, skinned and eviscerated for measuring carcass parameters. After the removal of the visceral organs and head, the remaining part was measured as carcass weight and this was later expressed as percentage of the fasted weight to get the dressing percentage (Fielding, 1991). The relative weights of the liver, kidneys, and heart were determined using the formula:

Giblets weight, % = Giblets weight(wt)/Pre-slaughter weight of rabbit× 100

Dressing weight,% = Carcass weight +giblets weight/Pre-slaughter wt ×100

The pH of Biceps femoris was measured at 1 hr post-mortem and the chemical composition of rabbit meat including crude protein (C.P %), ether extract % and ash % were determined according to A.O.A.C. (2000).

Energy values (E.V) of rabbit meat (Cal/ 100g.) was calculated according to Winton and Winton (1958) equation as follows:

E.V (Cal /100g.) = 4.1 (% Protein + % Carbohydrates) + 9.3 (% Fat).

Blood samples were taken after slaughtering within each group and collected into dry clean centrifuge tubes. Blood plasma was separated by centrifugation at 5500 r.p.m. for 10 minutes and kept in a deep freezer a (-20ºc) until biochemical analysis. ALT and AST were colorimetrically determined using commercial kits purchased from Bio-diagnostic, EGYPT, following the same steps as described by manufactures. However, total protein level was estimated according to Armstrong and Corri (1960), albumin level was estimated according to Doumas *et al.,* (1971). Globulin level values were obtained by subtracting the levels of albumin from corresponding values of total protein.

Economical efficiency (E.E%):

Economic efficiency of meat production was calculated from input-output which was calculated according to the prices of the experimental diets and body weight gain during the year of 2016. The values of economical efficiency for meat production were calculated according to Heady and Jensen, (1954) as follows:

Economic efficiency (E.E%)= Net revenue (L.E)/Total feed cost (L.E)×100.

While, the price of experimental diet was 2750 L.E per ton and the price of one kilogram body weight selling was 24 L.E, based on prices of Egyptian market during the experimental period (Spring 2016).

Statistical analysis:

Data of experiment were statistically analyzed using SPSS (2014) according to Sendcor and Cochran (1982) as the following model:

$$Yij = \mu + Ti + eij$$

Where Yij = he individual observation, μ = The overall mean, Ti = The effect of treatments, eij = The experimental error.

Significant differences between treatments means were tested according to Duncan’s Multiple test (Duncan, 1955).

RESULTS AND DISCUSSION

Growth performance:

Results in Table 3 showed a significant (P< 0.01) decrease in live body weight of growing NZW with restriction feed during all ages studied, also daily weight gain decreased significantly (P< 0.01) with restriction feed from 5 – 9 weeks of age while it was insignificantly from 9-13 weeks of age. These results agreed with (Govaerts *et al.,* 2000 and Bergaoui *et al.,* 2008) who reported that the feed restriction suppresses growth during the restriction period, but the growth reduced can be compensated with greater future intake. These results disagreement with Di Meo *et al.,* (2007) who studied the effects of free feeding and feeding restricted to 900 g/d/rabbit of the free intake for growing rabbits from 5 to 12 weeks of age, and observed that there was no difference in the body weight and daily weight gain results.

As presented in Table (3), feed restriction system had no effect on mortality percentages of the growing rabbit and no mortality was detected during the experimental period. These results confirmed several previous studies which indicated that feed restriction did not influence mortality percentage of growing rabbits (Foubert *et al.,* 2008 and Ebeid *et al.,* 2012), Also Gidenne *et al.,* 2012 showed that a more long restriction (for 2 or 3 weeks) of growing rabbits reduced mortality and morbidity from digestive troubles, while in contrast El-Speiy *et al.,* (2015) reported that feed restriction significantly (P ≤ 0.05) decreased mortality rate as compared with the control group (*ad libitum*).

Results showed a significant (P< 0.01) increase in feed intake of growing NZW with *ad libitum* group (control) as compared with other restriction ones during all experimental periods studied, while the best results of feed conversion recorded with (T5) group of restriction feed all periods 5-13 weeks of age, (Table 6). These result agreed with Alabiso *et al.,* (2016) who summarized that restriction feed system for a 3-week post-weaning of growing rabbits significantly (P< 0.001) decreased feed intake by (−22 to −24 g dry matter/day) and gave a lower feed conversion ratio than *ad libitum* feeding.

Carcass traits:

As presented in Table 4 dressing weight %, significantly (P< 0.01) increase by feed restriction as compared with *ad libitum* feed and the highest value was recorded with T2 (restricted feed from 5-7 weeks of age only), where carcass % was not influenced with treatments. Hind part weight %, recorded a high % with restriction feed system of T2 and T3 as compared with *ad libitum* or long restriction period (T4 and T5). Liver

Table 3. Live body weight, weight gain and mortality rate ($\overline{X}$±SE) of growing NZW as affected by feed restriction during all experimental periods.

Traits / Treatment groups	Live body weight					Daily weight gain					MR
	5 wks	7 wks	9 wks	11 wks	13 wks	5-7 wks	7-9 wks	9-11 wks	11-13 wks	5-13 wks	
T1	776	1016a	1576a	1857a	2096a	17.16a	40.04b	20.05	17.07	23.32a	0
T2	772	861b	1486b	1786b	2023a	6.38c	44.62a	21.41	16.97	22.09a	0
T3	807	885b	1275d	1607c	1848b	5.67c	27.79d	23.69	17.22	18.30b	0
T4	775	857b	1328c	1553d	1789c	5.83c	33.65c	16.02	16.88	17.48b	0
T5	758	868b	1223d	1621c	1860c	7.86b	25.40d	28.38	17.10	19.24c	0
SEM	7.34	14.95	32.59	30.79	31.53	17.35	25.71	20.58	17.11	34.71	-
P values	0.33	0.001	0.001	0.001	0.001	0.001	0.001	0.081	0.938	0.001	-

Means in the same column without common superscripts are different at the level P< 0.05.
Wks: Weeks, MR = Mortality rate (%).

Table 4. Carcass traits ($\overline{X}$±SE) of growing NZW as affected by feed restriction at the end of experimental period.

Traits (%)	Treatments						
	T1	**T2**	**T3**	**T4**	**T5**	SEM	**P values**
Pre-slaughter weight	2105	2015	1852	1790	1856	31.83	0.001
Hot Carcass weight, %	48.67	50.47	49.82	48.73	47.91	0.49	0.507
Dressing weight,%	58.61b	60.67a	59.93a	58.98b	58.05b	0.52	0.010
Forepart weight,%	16.60	16.52	16.50	16.65	16.42	0.23	0.979
Intermediate part weight, %	16.52	16.55	16.45	16.82	16.35	0.34	0.453
Hind part weight,%	23.35b	25.27a	25.02a	23.30b	22.87b	0.42	0.001
Head weight, %	6.07	6.14	6.08	6.15	5.96	0.13	0.460
Giblets weight, %	2.77b	2.80b	2.75b	3.02a	2.93a	0.09	0.001
Liver weight, %	0.28	0.28	0.29	0.27	0.30	0.02	0.926
Heart weight, %	0.82	0.77	0.80	0.81	0.82	0.03	0.912
Kidney weight, %	2.24a	1.98b	1.75c	1.72c	1.56d	0.12	0.001
Abdominal fat weight, %	7.25c	7.40c	7.72b	8.16a	8.08a	0.22	0.012
Empty intestine weight, %	15.54a	14.07b	13.90b	13.17c	13.04c	0.38	0.001

Means in the same raw without a common superscripts are different at the level P< 0.05.
Dressing weight,% = Hot Carcass weight, % + Giblets weight, % + Head weight, %.

weight % significantly (P< 0.001) increased by restriction feed system as compared with *ad libitum*, these result in disagreement with Yakubu *et al.,* (2007), who studied the effects of feed restriction on weaned rabbits and reported that there was no difference in the liver % as compared with *ad libitum* group. Abdominal fat weight %, significantly (P< 0.001) decreased by restriction feed system as compared with *Ad libitum* group, these results agreed with Yassein *et al.,* (2011) and agreed partly with Bovera *et al.,* (2008) who showed that *ad libitum* group gave a higher contents of scapular and perirenal fat but the high variability (high standard deviation) of this parameter fail to reach statistically significance. Empty intestine weight %, significant (P< 0.05) increased by restriction feed system, these results agreed with Bovera *et al.,* (2008) who indicated that empty gastro intestinal tract on pre-slaughter live weight was significantly (P< 0.01) higher for restriction than ad libitum feed of growing rabbit.

Other carcass traits of (weight of each forepart, intermediate part, head, heart, kidney percentages) were insignificantly affected with feed restriction system during experimental period as shown in table 4, these result in agreement with El-Speiy *et al.,* (2015) who found that fed different restriction strategies insignificant effects on relative weight of some organs of growing rabbits.

Meat quality:

Results in Table 5 showed a significant (P< 0.01) increase in dray matter and crude protein percentages of growing NZW with restriction feed and it’s seem to increase linearly with increasing restriction period as compared to *ad libitum* feed. These result agreed with Lebas and Ouhayoun (1987) who found that the significant decrease in the intensively growing muscles in rabbits with feed restriction, but when rabbits were again fed *ad libitum*, then the protein content in meat increased. In the same trend with quantitatively restricted feed for rabbits, Xiccato (1999) showed slightly higher protein level in rabbits with restriction than in those fed *ad libitum*. These results in disagreement with El-Speiy *et al.,* (2015) who indicated that feed restriction significantly (P≤ 0.01) decreased the meat content of dry matter and crude protein in V-line growing rabbits at 84 days of age.

Fur significantly (P < 0.01) decreased with restriction feed as compared by *ad libitum* feed, these result in accordance with Tumova *et al.,* (2006). Moreover, the present results showed that differences in ash (%) did not statistically differ between *ad libitum* or restriction feed, also rabbit

Table 5. Meat composition and some blood parameters ($\overline{X}$±SE) of growing NZW as affected by feed restriction at the end of experimental period.

Traits	Treatment groups						
	T1	**T2**	**T3**	**T4**	**T5**	SEM	**P values**
Dray matter ,%	27.11d	27.94c	28.19c	28.72b	29.30a	3.55	0.003
Ph (after 1 hour**)**	6.94	6.91	6.94	6.94	6.92	0.67	0.714
Crude protein, %	19.38b	19.82b	20.38a	20.45a	20.79a	2.74	0.023
Ether extract, %	4.14a	3.92b	3.73c	3.65c	3.32d	0.48	0.001
Ash, %	3.57	3.65	3.73	3.62	3.77	0.31	0.703
Energy value(cal/100g)	128.72a	127.32b	126.85b	126.15c	124.55d	14.76	0.001
Total protein(g/dl)	6.03	6.12	6.07	6.14	6.11	0.52	0.942
Total albumin(g/dl)	3.90	3.98	3.82	3.99	3.93	0.33	0.556
Globulin(g/dl)	2.13	2.14	2.25	2.14	2.18	0.29	0.960
AST (U/ L)	58.50	57.62	57.50	57.37	57.62	5.04	0.989
ALT U / L	29.22	28.87	28.94	28.40	28.88	2.29	0.788
Cholesterol (mg/dI)	63.15a	57.37b	51.82c	49.75d	48.82d	6.20	0.001

Means in the same raw without a common superscripts are different at the level P< 0.05.

meat pH after slaughter by one hour was not affected by restriction feed as shown in Table 5.

Results showed in present study agreed with El-Speiy *et al., et al.,* (2015) who reported that meat chemical composition is an important indicator for meat quality and feed restriction is one from several factors which affect the comical composition. On the other hand, these result disagreement with Alabiso *et al.,* (2016) who summarized that restriction feed for a 3-week post-weaning did not alter rabbit meat quality, as compared with *ad libitum*.

Blood parameters:

As presented in Table (5), feed restriction had no significant effect on blood parameters of (total protein, albumin, globulin, AST and ALT) of the growing rabbit, these result agreed partly with Ebeid *et al.,* (2012) who found that no significant effect in plasma total proteins due to feed restriction for growing rabbit. On contrast, the present results disagreement with Rajman *et al.,* (2006) who confirmed that feed restriction decreased plasma concentrations of total protein and albumin.

Plasma cholesterol significantly (P< 0.001) decreased with restriction feed system, especially with increasing restriction period from 2 to 8 weeks. These result agreed with Ebeid *et al.,* (2012) who showed that feed restriction resulted in reducing blood cholesterol, indicating lipid depletion of rabbits.

Economical efficiency:

Results in Table 6 showed a significant (P< 0.01) improvement in economic efficiency % of growing NZW with restriction feed and the best result was (192.98%) which recorded with full restriction feed during all experimental period studied, while the worst one was *ad libitum* feed (T1, control) giving 157.10% as shown in Table 6.

These results agreed with Gidenne *et al.,* 2003 who reported that the application of feed restriction during fattening period of rabbits, without compromising too much the growth, may be a good strategy for rabbit management, because it may decrease the feeding cost and reduce the health risk. On the other hand also, the present result in accordance with Oliveira *et al.,* (2012) who reported that the best economic efficiency per rabbit were obtained with feed restriction in two periods (33-40 and 54-61 days of age) and from 54 to 61 days of age as compared by these obtained with rabbits feeding *ad libitum* and they presented better economic efficiency because during the re-feeding, priority was given to recovering the organ weight, and they added, as the muscles are better formed in high ages, they may have felt less the effects of restriction when it was applied later.

Therefore, economic efficiency % improved with decreasing of feeding cost through using strategy of feed restriction which gave a beneficial effect of feed efficiency and weight gain (main factors used in calculation of economical efficiency %). This result agreed with recent strategy of Gidenne *et al.,* (2017) who reported that future possibilities for genetic selection for feed efficiency are based on improvements to the residual feed intake and it seems possible to improve feed efficiency further by reducing feed intake without affecting weight gain. Such a genetic improvement would reduce both feed input (reducing costs) and output (reducing environmental impacts). An average farm feed conversion rate of 3.0, can be reached in the next decade for rabbit meat production.

Table 6. Feed intake, feed conversion and economic efficiency ($\overline{X}$ ±SE) of growing NZW as affected by feed restriction, during all experimental periods.

Traits / Treatment groups	Daily feed intake (g.)					FC 5-13 wks	EE %
	5-7 wks	7-9 wks	9-11 wks	11-13 wks	5-13 wks		
T1	70.17a	133.57a	142.30a	153.12a	129.52a	5.58c	157.10d
T2	49.75b	120.20b	130.90b	137.75b	109.65b	4.96a	175.78b
T3	49.65b	74.76c	125.55c	135.25b	96.30c	5.25b	165.81c
T4	49.82b	74.88c	99.76d	134.75b	89.80c	5.18b	169.85c
T5	49.75b	74.67c	99.96d	123.25c	87.03c	4.57a	186.98a
SEM	7.25	18.51	22.68	19.80	32.35	1.07	17.89
P values	0.001	0.001	0.001	0.001	0.001	0.04	0.01

Means in the same column without common superscripts are different at the level P< 0.05.
FC= Feed conversion (kg feed/kg gain), EE,% = Economic efficiency

Conclusively, feed restriction system influenced positively on the performance (specially feed and economic efficiencies), some carcass traits and meat quality of growing rabbits. On the other hand, a positive effect was observed in the % of abdominal fat and plasma cholesterol. The impact of feed restriction depends on the duration and amount for growing NZW rabbits was beneficial for those of feed and economic efficiencies under Egyptian conditions.

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تأثير نظام تحديد الغذاء على الأداء، صفات الذبيحة، جودة اللحم وصفات الدم للأرانب النامية

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تهدف هذه الدراسة لبحث تأثير نظام تحديد الغذاء على أداء النمو، صفات الذبيحة، جودة اللحم وقياسات الدم للأرانب النامية من نوع النيوزيلاندى الأبيض. حيث استخدم عدد 90 أرنب نيوزيلاندى أبيض (نسبة ذكور إلى إناث 1 : 1) فى عمر الفطام 5 أسابيع (بمتوسط وزن جسم 777,48 جرام ± 10,38) ، وتم تقسيمها عشوائيا إلى خمسة مجموعات تجريبية (كل مجموعة بها 18 أرنب) حيث غذيت المجموعة الأولى حد الشبع واستخدمت كنترول، المجموعة الثانية تم تحديد كمية الغذاء فيها لأول أسبوعين فقط ، المجموعة الثالثة تم تحديد الغذاء فيها لمدة أربعة أسابيع فقط، المجموعة الرابعة تم تحديد الغذاء فيها لمدة ستة أسابيع فقط و المجموعة الخامسة تم تحديد الغذاء فيها طول مدة التجربة (8 أسابيع).

أظهرت النتائج المتحصل عليها زيادة معنوية على مستوى (0,01) لوزن الجسم الحى، الزيادة الوزنية واستهلاك العلف فى المجموعى الأولى (تغذية حد الشبع) مقارنة بباقى المجموعات. لم يلاحظ أى تأثير معنوى للحالة الصحية أو نسبة النفوق للأرانب خلال الفترات التجريبية.

انخفض دهن البطن معنويا على مستوى (0,05) للأرانب محددة الغذاء مقارنة بمجموعة الكنترول. لم تتأثر درجة حموضة اللحم بتحديد الغذاء. من جهة أخرى لم تتأثر معنويا قياسات الدم المدروسة نتيجة المعاملة.

التوصية: يمكن نوصى بأن تحديد الغذاء للأرانب النامية بكميات مختلفة عند أعمار مختلفة يمكن أن يكون مناسبا بدون أى تأثيرات سلبية على الأداء ، جودة اللحم وقياسات الدم. كذلك فإن تحديد الغذاء يكون مفيد فى تحسين الكفاءة الغذائية والإقتصادية.