

## EFFECT OF REDUCTION OF FEEDING TIME ON THE PERFORMANCE OF GROWING RABBITS

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### Abstract

The effect of restricted feeding through a longer time period on the performance parameters and carcasses' qualitative traits of the fattening rabbits was studied. 42 rabbits of six weeks old were grouped into three identical groups. The rabbits under the control group were fed *ad libitum*, while the ones under the two other groups (experimental groups) were fed through some feeding time restrictions, as the following: (7 hours/day) during the two and three first weeks of fattening respectively. Afterwards, up to the age of 14 weeks, all of them were fed *ad libitum* again. At the end of the trial, it was concluded that both the body weight and daily gain were statistically not influenced by the time duration of the restricted feeding. Although the second group of experiment showed a substantial daily feed intake ( $p \leq 0.01$ ), non significant effects on the feed conversion rate was demonstrated. Feed restriction time for two and three weeks didn't show the same effect on the carcasses' parameters. While percentage of internal organs increased, abdominal fat percentage was reduced with the length of time feed restriction aged at 14 weeks.

**Key words:** Rabbits, carcass, feed restriction, performance, body weight.

### Introduction

In the last years, there has been an increased interest in studying feed restriction in rabbits (Tumova *et al.*, 2004; Yakubu *et al.*, 2007). Feed restriction has been studied in order to improve biological and economic performance (Tumova *et al.*, 2006), i.e. as a means of reducing the costs of production (Yakubu *et al.*, 2007).

Feeding strategy in growing rabbits should be used to produce animals with maximum lean body mass, highest feed conversion ratio and maximum body weight. Feeding techniques with potential impacts to improve feed efficiency (Tumova E, *et al.*, 2002) include limiting the intake of energy and protein (qualitative restriction of food) and quantitative feed restriction (Feugier, 2002, Perrier, 1998). A "quantitative" restriction can be applied according to two methods: the time for access to the feeder or the quantity of feed distributed can be reduced (Feugier, 2002; Szendrő *et al.*, 2000).

Feed restriction increases feed efficiency (Perrier and Ouhayoun, 1996; Tùmová *et al.*, 2002; Dalle Zotte *et al.*, 2005), improves digestibility of nutrients in a restricted feeding period (Tùmová *et al.*, 2004; Di Meo *et al.*, 2007) and can prevent post-weaning digestive disorders (Gidenne *et al.*, 2003).

Limiting the time of feed consumption and availability can avoid feed losses and consumption of larger quantities by the rabbits. This technique can easily be applied in practice and it has some priorities due to a better growth rate of rabbits and a better use of the feed ingredients.

The objective of our investigation was to determine the effects of feed restriction's time duration on growth performance and carcass's traits in growing rabbits.

## Material and Methods

The present work was carried out at the rabbit farm in Albania. 42 California Breed rabbits of 6 weeks old were put under the trial. The rabbits were divided into 3 groups of 14 heads each. The control group was fed *ad libitum* throughout the trial's period, while the two other groups were fed within a limited time; as following: the first two weeks (6-8 weeks of age) for one/first group and the first three weeks (from age 6-9 weeks) for the other/second group under the trial. After the feed restriction period of time, the rabbits of both groups were fed *ad libitum*. During the feed restriction time, the rabbits were fed daily within the time interval of 08.00 - 15.00 hrs. Every day, at the end of feeding period (after 15.00) in the experimental group the feed troughs were cleaned to be filled in the next morning. The drinking water was available and not limited all the time. At the beginning of the experiment, the average weight of rabbits under the three groups was similar.

Table 1. Methodical scheme of the experiment

Age in weeks	Control	Experiment 1 (E.1)	Experiment 2 (E.2)
6-14	Ad libitum	6-8 weeks (restricted feeding)	6-9 weeks (restricted feeding)
		8-14 weeks (Ad libitum)	9-14 weeks (Ad libitum)

Rabbits were fed with pelleted feed, containing 17.7% protein and 2890 kcal ME/kg.

All the data were recorded and calculated for each week until week 14, such as: body weight, gained weight, feed consumption and feed conversion.

At the age of 14 week from each group 4 rabbits were starved for about 16 hours, individually weighed, slaughtered, skinned and eviscerated. Eviscerated carcasses with giblets (liver, kidneys and heart) and without the head were weighed individually and dressing percentage was calculated (eviscerated carcass; liver, kidneys and heart in relation to pre-slaughter weight). Cleaned carcasses were divided into parts: hindquarter, forequarter, and loin. These parts, the giblets and the abdominal fat were individually weighed and were calculated as a percentage of their weight in relation to the carcass's weight.

The statistical analyzes were carried out according to SAS program using the following model:

$$Y_{ijk} = \mu + D_i + A_j + (DA)_{ij} + e_{ijk}$$

Where:

$Y_{ijk}$  = observed value for the requested trait;

$\mu$  = overall mean for the requested trait;

$D_i$  = fixed effect due to duration of severe restriction;

$A_j$  = fixed effect because of the age;

$(DA)_{ij}$  = effect of correlation between the duration of feed restriction and age;

$e_{ijk}$  = random error.

## Results and Discussion

### *Growth performance indicators*

Growth performance indicators of the rabbits are presented in Table 2.

Table 2. Performance indicators of rabbits by groups (calculated with the average small squares)

Indicators	Control Group	Experiment 1 (E.1)	Experiment 2 (E.2)
Initial body weight of rabbits (kg)	0.638±0.020	0.635±0.020	0.636±0.020
6-14 weeks (56 days)			
Body weight (kg)	2.243±0.420	2.320±0.420	2.056±0.420
Daily gain (g)	28.661±0.76	30.089±0.76	25.357±0.76
Daily feed consumption (g)	114.82±2.45	110.50±2.45	93.260±2.45
Feed conversion	4.006±0.800	3.672±0.800	3.678±0.800

The rabbits of the E1 group, demonstrated to have a higher body weight than the other two groups at 14 weeks, compared with the ones fed *ad libitum* even higher than the ones restricted fed during three weeks (3.43 and 12.84 %).

The weight gain demonstrated the same tendency as the body weight. Rabbits under the first group of experiment (E1), at 14 weeks gained more than the ones fed *ad libitum* (4.98%) even more than the rabbits under the (E2) second group of experiment (18.66%). The depression in daily gain (in experiment 2) was attributed to the reduction in daily feed intake with increasing the duration of feed restriction. However, for both indicators (body weight and weight gain) differences were statistically non significant ( $p > 0.05$ ).

The survey data are consistent with literature sources. After the feed restriction period, when rabbits were fed *ad libitum* again, there was observed a compensatory growth, while the intensity of this growth is related to the intensity of restriction (Gidenne et al., 2003). The distinctive capability of rabbits to a compensatory growth after feed restriction period was studied about 30 years ago (Lebas and Laplace, 1982; Ledin, 1984) and in recent years (Szendro et al., 1988; Matics et al., 2008).

Statistically significant differences were verified for the amount of daily feed consumption during the week 14 ( $p \leq 0.01$ ) where the group E.2 seems to be more inferior in comparison with the two other groups. During the week 14, the restricted daily feed for the E.1 and E.2 groups, represents 3.76% and 18.78% of the amount consumed by the *ad-libitum* fed group.

Extension in time, for two and three weeks, of the feed restriction didn't show any significant improvement in the feed conversion of these two groups. The optimal feed conversion was observed in the E.1 group, although differences between groups were not statistically significant. The feed consumption respectively of the E.1 and E.2 group during the 14 weeks of age was 8.34% and 8.19% lower/unit of weight compared with the control group.

These results are close to other sources of literature (Rao et al., 1978) stating that the time limitation of feed consumption/availability in less than 9 hours/day, for the period 4-12 weeks, led to the reduction of the quantity of daily consumed feed in 6-15%, but feed conversion was improved to the extent of 7-13%, while the rabbits' daily weight gain remained unchanged.

### *Carcass traits*

Table 3: Carcass traits of growing rabbits according to the group (average small squares + SE)

Trait	Week	Control Group	Experiment 1 (E.1)	Experiment 2 (E.2)
Starved body weight (g)	14	2140,73±89.95	2250.20±45.98	2007.35±84.70
Carcass's Weight (g)	14	1193.46±60.21	1251.56±20.73	1110.73±17.20
Dressing (%)	14	55.75±0.54	55.62±0.85	55.33±1.05
Hindquarter (%)	14	34.94±0.80	34.11±0.68	34.20±0.82
Forequarter (%)	14	35.28±0.88	35.74±1.04	36.08±0.56
Loin (%)	14	19.20±0.80	19.05±0.74	19.10±0.73
Giblets (%)	14	6.35±0.035	6.75±0.027	7.20±0.27
Abdominal fat (%)	14	4.23±0.082	4.05±0.030	3.02±0.41

Data in Table 3 indicated that E.1 group was superior in starved body weight at 14 weeks, but differences among treatments were insignificant ( $p \leq 0.05$ ). Dressing percentage was insignificantly decreased with increasing the duration of severe feed restriction at 14 weeks of age. Carcass cut-up parts were not significantly influenced by increasing the duration of severe feed restriction. Feed restriction during two and three weeks did not uniformly affect the carcass's parts. Percentage of giblets increased with the length of time feed restriction aged at 14 weeks. Abdominal fat percentage was reduced to the length of time feed restriction at 14 weeks.

### Conclusions

On the bases of obtained results about effect of reduction of feeding time on the performance of growing rabbits could be concluded:

- Body weight and daily gain were not statistically influenced by increasing the duration of restricted feeding;
- Extension of feed restriction's time reduced the feed consumption by the rabbits,
- No significant effect was observed on feed conversion rate while the rabbits were fed restricted during a 2 or 3 weeks period of time,
- Carcass traits were not affected by increasing the duration of restricted feeding.

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