THE EFFECT OF DIFFERENT WEANING AGES ON PERFORMANCE IN HYLA RABBITS

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ABSTRACT

The effect of the weaning age of rabbits on growth, feed consumption, mortality and selected slaughter and carcass characteristics was studied in a fattening experiment. One hundred eight HYLA® rabbits from the Genetic Center HYLA Ratibořice were assigned to two groups of 60 and 48 rabbits according to weaning age of 21 and 35 days, respectively. The experimental diet had 171 g/kg crude protein and 45 g/kg crude fat. Feed and water were available *ad libitum*. At 35, 42, 49, 56, 63, 70 and 77 days of age, six rabbits of each weaning age were slaughtered. In the experiment, most performance results were not significantly affected by the weaning age. Only the rabbits weaned at 21 days of age had significantly ($P \leq 0.05$) lower live weight at the age of 35 days (1022 and 1098 g, respectively), but at the end of experiment we did not find any differences between the groups. The weaning age did not influence weight gain and feed intake, but mortality was higher in rabbits weaned at 21 days of age. In the majority of slaughter ages, there were a significantly higher live weight, hot carcass weight, chilled carcass weight, liver ratio to carcass chilled weight and insignificantly higher dressing out percentage in rabbits weaned at 21 days of age, while in rabbits weaned at 35 days of age a higher drip loss percentage was recorded.

Key words: Rabbit, HYLA, weaning age, slaughter age, growth, feed intake.

INTRODUCTION

The information about the effect of early weaning of rabbits is contradictory. The growth of rabbits could be affected by weaning age, where Trocino et al. (2001) observed that early weaned kits showed a lower live weight in comparison with rabbits weaned at 32 days of age. The negative effect of early weaning on live weight was also found by Gidenne and Fortun-Lamothe (2004), Gallois *et al.* (2003, 2004) and Bivolarski *et al.* (2011). Tůmová *et al.* (2006) did not find any significant differences in live weight during the time of fattening. Early weaning age did not influence feed consumption (Gidenne and Jehl, 2001; Xiccato *et al.,* 2000). It seems that the digestive tract development did not have any effect on feed consumption in early and traditional weaned rabbits (Xiccato *et al.,* 2000; Tůmová *et al.,* 2006). Little is known about carcass performance of early weaned rabbits. Bivolarski *et al*. (2011) indicated a statistically significantly lower dressing percentage in early weaned rabbits at 21 days of age as compared to normally weaned animals. Mortality can be affected by the weaning, as well. Gidenne and Fortun-Lamothe (2004) found higher mortality in the early weaned rabbits. According to Trocino *et al.* (2001) and Xiccato *et al.* (2003), the weaning age did not affect the mortality.

The objective of this study was to evaluate the effect of two different weaning ages on the basic parameters of fattening performance and selected characteristics of carcass value in HYLA rabbits.

MATERIALS AND METHODS

Animal and experimental design

The monitoring was on HYLA® rabbits obtained from a commercial farm (Genetic Center HYLA Ratibořice), weaned at 21 (n = 60) and 35 (n = 48) days of age. Then the animals were identified and weighed. The young rabbits were housed in fattening cages (0.2 m^2 per rabbit). The environmental conditions corresponded to the usual requirements for the microclimate during the fattening of rabbits. The rabbits were fed a feed mixture *ad libitum*. Drinking water was also available *ad libitum* from nipple drinkers. The diet composition and the analyzed content of nutrients per 1 kg of diet are given in Table 1. From weaning, the kits had access to solid feed of the does.

Table 1: Ingredients (%) of feed mixture (Volek *et al*., 2007) and chemical composition (g/kg)

Ingredients	%	Chemical composition	g/kg
Alfalfa meal	28	Dry matter	896
Sunflower meal	19	Crude protein	171
Wheat bran	24	NDF*	352
Sugar-beet pulp	4	Lignocellulose (ADF)*	214
Oats	13	Starch	144
Barley	7	Crude fat	45
Rapeseed oil	2	Digestible energy (MJ/kg)¶	10.4
Vitamin supplement[1]	1		
Dicalcium phosphate	0.5		
Limestone	1		
Salt	0.5		

[1]Per kg supplement: vitamin A - 1 200 0000 IU; vitamin D_3 - 200 000 IU; vitamin E - 5 g; vitamin K_3 - 0.2 g; vitamin B_1 - 0.3. g; vitamin B_2 - 0.7 g; vitamin B_6 - 0.4 g; niacinamide - 5 g; Ca-pantothenate - 2 g; folic acid - 0.17 g; biotin - 20 mg; vitamin B_{12} - 2 mg; choline - 60 g; lysine - 25 g; DL-methionine - 100 g.
*According to the sequential method of Van Soest *et al.* (1991); NDF = neutral-detergent fibre, ADF = acid-detergent fibre.
¶Calculated according to Maertens *et al.* (2002).

Measurements and slaughtering and dissection procedure

The following traits were recorded: live weight from weaning to slaughter, average daily gain, mortality, average feed consumption and some carcass traits. The animals were individually weighed every week, and feed consumption was measured weekly per group. The health status was also recorded in the groups over the entire period of fattening.
The animals were slaughtered at the age of 35, 42, 49, 56, 63, 70 and 77 days of age (six rabbits of each weaning age of the average live weight) for determination of carcass value. The slaughter and carcass dissection were carried out in an experimental slaughterhouse. The rabbits were fasted overnight and slaughtered the following morning by electric stunning and bleeding by jugular cut.

The rabbits were weighed immediately before slaughter and the carcasses placed in a cooling room at 4 °C temperature and provided with circulated air for 24 hours. The chilled carcasses were then weighed (with head, heart, lungs, liver, kidneys, periscapular and perirenal fat). The carcass dissection procedure was performed in accordance with Blasco and Ouhayoun (1996).

Statistical Analysis

Statistical analysis was performed by the SAS 9.2 statistical package (SAS Institute Inc., 2008) with GLM procedure for all parameters. The effects of weaning age and slaughter age were included in the model for slaughter and carcass characteristics. Interaction between the weaning age and slaughter age was not statistically significant and was not included in the model.

RESULTS AND DISCUSSION

In the experiment, most performance results (Table 2) were not significantly affected by the weaning age. Only the rabbits weaned at 21 days of age had significantly (P≤0.05) lower live weight at the age of 35 days, but at the end of the experiment we did not find any significant differences between groups. The results of our experiment are in accordance with the findings of Trocino *et al.* (2001). On the other hand, higher live weight of early weaned rabbits was recorded at 35 days of age by Xiccato *et al.* (2003) and Gidenne *et al.* (2004). There were no significant differences in daily feed consumption. Gallois *et al.* (2003, 2004) demonstrated that the early weaned rabbits had a higher feed consumption in comparison with rabbits weaned at 35 days of age. The feed conversion ratio, in our experiment, was approximately 10% higher in the rabbits weaned at 21 days of age in comparison with traditionally weaned rabbits. Mortality of one rabbit per period was recorded each from 21 to 28 days of age, from 42 to 49 days of age and from 49 to 56 days of age in the rabbits weaned at 21 days of age and from 63 to 70 days of age in the rabbits weaned at 35 days of age. The results of our experiment are in accordance with the findings of Gidenne and Fortun-Lamothe (2004), who found higher mortality in the early weaned rabbits.

Table 2: Growth, feed consumption and mortality (mean ± sd).

Measurement	Weaning age		Significance	SEM
	21	35		
Live weight (g)				
initial (n = 60/48)	425 ± 71.9	1098 ± 129.9	nm	
at 35 days of age (n = 47/48)	1022[b] ± 81.1	1098[a] ± 129.9	*	11.7
at 70 days of age (n = 15/17)	2797 ± 174.5	2721 ± 199.8	ns	33.5
at 77 days of age (n = 9/11)	3089 ± 230.4	3010 ± 246.0	ns	52.8
Period: 35 – 77 day of age				
Weight gain (g)	47.12 ± 5.3	44.40 ± 5.5	ns	1.2
Feed intake per day per rabbit (g)	120	122	nm	
Feed conversion ratio (kg/kg)	4.1	3.7	nm	
Mortality (n)	3	1	nm	

sd – standard deviation, nm – not measured; *P≤0.05, ns – not significant, [a, b]in terms of age, means with different letters in the same row differ significantly, determined by Scheffe's test, SEM – standard error of mean

Table 3: Slaughter and carcass characteristics (mean).

Weaning age	Slaughter age (days)	Measurement (n = 6)					
		LW (g)	HCW (g)	CCW (g)	DLP (%)	DoP (%)	Liver % CCW
21	35	903	488.6	454	7.1	50.3	6.6
	42	1103	547.4	523.3	4.4	47.5	6.4
	49	1546	807.6	779.4	3.3	50.2	7.8
	56	1873	1051.6	1010.8	3.9	53.9	6.2
	63	2174	1262.1	1219.2	3.4	55.9	6.0
	70	2754	1657.5	1582	4.6	57.4	7.0
	77	2964	1811.7	1739	4	58.7	5.9
35	35	884	470.7	446.6	5.2	50.4	7.4
	42	1159	615.6	589.1	4.3	50.7	6.1
	49	1463	751.7	715	4.8	48.9	5.5
	56	1738	945.4	910.5	3.8	52.3	6.0
	63	1993	1087.6	1045.2	4	52	5.6
	70	2732	1637.5	1574.3	3.9	57.6	6.2
	77	2948	1782.5	1703.8	4.4	57.8	5.2
Significance	weaning age	*	*	*	ns	ns	*
	slaughter age	***	***	***	***	***	***
	weaning age * slaughter age	ns	ns	ns	ns	ns	ns
SEM		85.2	53.9	52.4	0.5	0.5	0.1

LW - live weight, HCW - hot carcass weight, CCW - chilled carcass weight, DLP - drip loss percentage, DoP - dressing out percentage, ns - not significant, *P≤0.05, ***P≤0.001, SEM - standard error of mean.

The effect of weaning age, slaughter age and interaction between them on selected slaughter and carcass characteristics are presented in Table 3. Live weight, hot carcass weight, chilled carcass weight and liver ratio to chilled carcass weight were affected by weaning age, but all characteristics in Table 4 were influenced by slaughter age. There were insignificant interactions among weaning age and slaughter age in slaughter and carcass characteristics. In the majority of slaughter ages, there were a significantly higher live weight, hot carcass weight and chilled carcass weight in rabbits weaned at 21 days of age in comparison with the rabbits weaned at 35 days of age.

In this experiment, the dressing out percentage significantly ($P \leq 0.001$) increased with the increase of slaughter age. The dressing out percentage was insignificantly higher (with moderate fluctuations) in rabbits weaned at 21 days of age in comparison with rabbits weaned at 35 days of age. The results of our experiment are not in accordance with the findings of Bilovarski *et al.* (2011), who reported a significantly higher dressing out percentage in rabbits weaned at 35 days of age. The results of the experiment show that there was a significantly higher liver ratio to carcass chilled weight in rabbits weaned at 21 days of age.

CONCLUSION

The weaning age did not have a significant effect on the majority of the performance parameters. The rabbits weaned at 21 days of age had significantly higher live weight at the age of 35 days, and then the live weight was not significantly affected until the end of the experiment. The weaning age influenced the slaughter and carcass characteristics (except the drip loss percentage and dressing out percentage). The results of this experiment may be affected by the smaller number of slaughtered rabbits at the slaughter ages. Early weaning can be used in the various European and non-European countries or regions where rabbits are slaughtered at a lower slaughter weight, which the rabbits in our experiment reached at 63 days of age with a 55.9% dressing out percentage.

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REFERENCES

Bivolarski B.L., Vachkova E.G., Ribarski S.S. 2011. Effect of weaning age upon the slaughter and physicochemical traits of rabbit meat. *Vet. Arhiv, 81, 499-511.*

Blasco A., Ouhayoun J. 1996. Harmonization of criteria and terminology in rabbit meat research. Revised proposal. *World Rabbit Sci., 4, 93-99.*

Gallois M., Gidenne T., Fortun-Lamothe L. 2003. Digestive development in the young rabbit: impact of a weaning at 21d. *Proc. 3rd Meetings of workgroup 3rd and 4th COST Action 848, Prague, Czech Republic, 15.*

Gallois M., Gidenne T., Fortun-Lamothe L., Le Huerou-Luron I., Lalles J. P. 2004. Weaning age and development of the small intestinal mucosa in the young rabbit. *Proc. 8th World Rabbit Congress, Puebla, Mexico, 1079-1085.*

Gidenne T., Fortun-Lamothe L. 2004. Growth, health status and digestion of rabbits weaned at 23 or 32 days of age. *Proc. 8th World Rabbit Congress, Puebla, Mexico, 846-852.*

Gidenne T., Jehl N. 2001. Bacterial biomass production in the growing rabbit according to the dietary fibre level. *Proc. 2nd Meetings of workgroup 3rd and 4th COST Action 848, Gödöllő, Hungary, 43.*

Maertens L., Perez J.M., Villamide M., Cervera C., Gidenne T. , Xiccato G. 2002. Nutritive value of raw materials for rabbits: EGRAN tables 2002. *World Rabbit Sci., 10, 157-166.*

Trocino A., Xiccato G., Sartori A., Queaque P. I. 2001. Effect of starter diet and weaning age on growth, caecal fermentation and body composition of young rabbits. *Proc. 2nd Meetings of workgroup 3rd and 4th COST Action 848, Gödöllő, Hungary, 52-53.*

Tůmová E., Zita L., Marounek M., Skřivanová V., Berladyn A. 2006. The effect of weaning age on performance, nutrient digestibility and lipase activity in broiler rabbits. *3rd Rabbit Congress of the Americas, Maringá, Brasil, 21. - 23. 9., CD.*

Van Soest P.J., Robertson J.B., Lewis B.A. 1991. Methods for dietary fiber, neutral detergent fiber, and non starch polysacharides in relation to animal nutrition. *J. Dairy Sci., 74, 3583-3597.*

Xiccato G., Trocino A., Sartori A., Queaque P. I. 2000. Early weaning of rabbits: effect of age and diet on weaning and post-weaning performance. *Proc. 7th World Rabbit Congress, Valencia, Spain, Vol. C, 483-490.*

Xiccato G., Trocino A., Sartori A., Queaque P. I. 2003. Effect of weaning diet and weaning age on growth, body composition and caecal fermentation of young rabbits. *Animal Sci., 77, 101-111.*

Volek Z., Marounek M., Skřivanová V. 2007. Effect of a starter diet supplementation with mannanoligosaccharide or inulin on health status, caecal metabolism, digestibility of nutrients and growth of early weaned rabbits. *Animal, 1, 523-530.*