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COMMUNICATION

Effect of maternal lysine supplementation on the performance of growing rabbits. Preliminary results

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ABSTRACT

The experiment studied the effect of dietary lysine supplementation to rabbit does on the performance and on meat's protein and lysine content of their offspring. Half of the does (n=43) fed control diet (C; Lys: 0.68%), while the other half a lysine supplemented diet (L; Lys: 0.80%) from 3 days before AI until weaning. After kindling, half of the litters of C does were put under C does, while the other half under L does. The same procedure was followed for offspring of L does. After weaning, rabbits fed the same diet (0.68% Lys). Does' dietary treatment significantly affected the weaning weight, however, only lysine supplementation during suckling age had negative effect (340 vs 315g for C and L does, respectively; $P < 0.01$). The kit's milk intake, measured at 3rd and 7th day of age, nursed by L does was significantly lower. Other productive and carcass traits did not differ significantly.

Key words: Rabbits, Lysine, Production, Meat.

Introduction

Researchers have paid attention to the threonine, methionine and lysine requirements of does and growing rabbits as well as on the effects on their performance (Colin and Allain, 1978; Maertens and De Groote, 1988; Taboada *et al.*, 1994, 1996; De Blas *et al.*, 1996). Meat production is determined by the muscle development, which occurs at foetal and early postnatal ages (Ouhayoun and Dalle Zotte, 1993). Thus, increasing lysine supplementation at foetal and suckling ages could affect the carcass traits. The aim of the experiment was to study the effect of early lysine supplementation on the productive and carcass traits as well as on the meat quality of growing rabbits.

Material and methods

At the rabbit farm of the Kaposvár University multiparous does were divided into two groups 3 days before AI. One group (n=43) was fed control (C), while the other one (n=43) consumed lysine supplemented (L) diet (Table 1). Two days before AI previous litters were weaned, thus, none of the does were nursing during pregnancy. At the 31st day of pregnancy (30 C and 40 L does became pregnant) parturition was induced by oxytocine. All kits were removed from the nests and new litters were formed equalized to 9 kits within doe's group (C or L) according to the kits weight. Then, half of the new litters of C does were put under C (CC), while the other half under L does (CL). The same procedure was followed for the litters of L does (LL and LC). Controlled lactation was per-

Table 1. Chemical composition and nutritive value of the diets.

Chemical composition		Diet of does		Fattening diet
		Control (C)	Lysine supplemented (L)	
Crude protein	%	18.1	18.1	16.0
Ether extract	"	4.1	4.1	3.0
Crude fibre	"	14.5	14.5	16.0
Lysine	"	0.68	0.80	0.68
Methionine + Cystine	"	0.64	0.63	0.53
DE	MJ/kg	10.68	10.67	10.60

Chemical composition was analytically determined. The crude protein content was determined by Kjeldhal method, the crude fat content by Soxhlet extraction after hydrochloric acid digestion. Amino acid content was determined by gas-chromatography (MacKenzie, 1987).

formed. At the 17th day nestboxes were opened and all rabbits consumed the same fattening diet (Table 1). At the 3rd, 7th and 14th days after parturition milk production was measured by weighing the litters before and after nursing (Table 2). At 21st day of age kits (n=541) were weighed and weaned. The kits' mortality is shown in Table 2. The lightest and the heaviest rabbits were excluded, thus rabbits near to the average body weight in each group were used afterwards (n=343). From weaning to slaughter rabbits were fed fattening

diet *ad libitum* (Table 1). Body weight and feed intake were measured weekly. Rabbits were slaughtered at 11 wk of age.

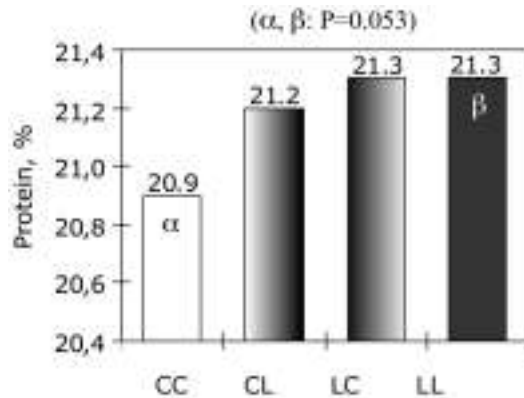
Slaughtering and dissection procedure were done according to Blasco and Ouhayoun (1996). Meat samples of hindleg meat were collected from 15 average weight rabbits per group for meat quality analysis, performed at the Department of Animal Science of Padova. Protein content of hindleg meat was calculated, while its lysine content within protein was analytically determined

Table 2. Effect of maternal lysine supplementation on the performance of offspring.

Traits		Lys during pregnancy (P)		Lys during lactation (L)		SE	Significance (P<)		
		C	L	C	L		P	L	P*L
Number of nursing does				23	36	-			
Milk consumption at 3 rd day	g/kit			11.2	9.3	0.42		0.021	
Milk consumption at 7 th day	"			21.2	18.9	0.51		0.026	
Milk consumption at 14 th day	"			26.8	25.8	0.72		0.507	
Kits' mortality	%	12.4	8.54	8.33	11.4	2.55	0.111	0.304	-
Number of rabbits		171	172	167	176	-	-	-	-
Body weight at 3 weeks of age	g	328	326	340	315	2.68	0.973	0.001	0.291
Body weight at 11 weeks of age	"	2560	2534	2571	2525	12.1	0.362	0.072	0.581
Weight gain between 3-11w	g/day	39.8	39.3	39.8	39.4	0.20	0.259	0.290	0.773
Feed intake between 3-11w	"	115	115	116	115	1.32	0.976	0.744	0.522
Feed conversion between 3-11w	"	2.89	2.93	2.89	2.93	0.03	0.442	0.519	0.999
Dressing out percentage	%	60.4	60.8	60.6	60.6	0.12	0.092	0.995	0.151

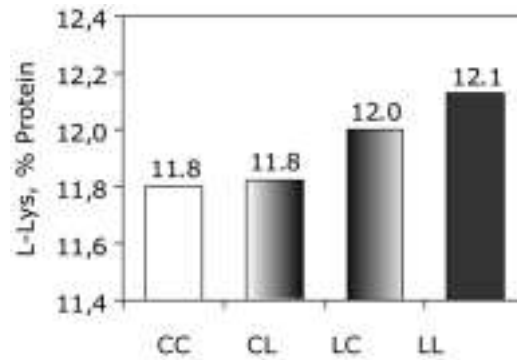
C, L: see Table 1

Figure 1. Effect of maternal lysine supplementation on the protein content of hindleg meat



CC: born from C doe and nursed by C doe; CL: born from C doe and nursed by L doe; LC: born from L doe and nursed by C doe; LL: born from L doe and nursed by L doe

Figure 2. Effect of maternal lysine supplementation on the lysine content within protein



(MacKenzie, 1987). Data were evaluated by two-way ANOVA using the SPSS 10.0 programme package (SPSS for Windows, 1999). Mortality was evaluated by χ^2 -test. The contrasts "lysine during pregnancy" and "lysine during lactation" were tested.

Results and conclusions

Dietary treatment of does significantly affected the weaning weight, however, it seems only lysine supplementation during suckling age had negative effect ($P=0.001$; Table 2). This is proved by the milk intake of kits which was lower in rabbits nursed by L does. However, significant difference was found only at the 3rd and the 7th day of lactation (Table 2). Taboada *et al.* (1994) fed diets of different lysine supplementation (0.64→0.82%) to rabbit does. They found increasing weaning weight with increasing dietary lysine until 0.76%. No difference was found in kits' mortality (Table 2).

No significant difference was found in the body weight at 11 wk of age (Table 2), thus rabbits nursed by L does could compensate during the fattening period. The weight gain was similar, and no significant differences were found in feed intake and feed conversion. Lysine supplementation during foetal age had positive influence on dressing out percentage ($P=0.092$; Table 2), while lysine supplementation during suckling age had no any

effect on this trait. Protein content of hindleg meat was somewhat higher in rabbits born or nursed by L does ($P<0.10$; Figure 1) with a slight improvement on lysine concentration of hindleg meat (ns; Figure 2). The lysine content found in the present work is considerably higher than that reported in literature (6.5-7.0% protein; Moughan *et al.*, 1988). Recent data report values close to those found in the present work (8.7% protein; INRAN, 2000). These discrepancy could derive from the sample (whole body tissue or edible parts for the literature cited and hindleg meat for the present work) or from the different analytical methodology

In conclusion, it was shown that supplementing the maternal diet with lysine during suckling age (from 0.68 to 0.80%) decreased the kits' weaning weight. Lysine supplementation during foetal or during suckling age had no effect on growth performance. However, maternal lysine supplementation could have a positive effect on some meat quality traits of the offspring, correlated to the protein content. To prove the positive effect of dietary lysine supplementation at early stage of body development further study have to be carried out.

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