

INFLUENCE OF REMATING INTERVAL AND LEVEL OF PROTEIN ON SENSORY CHARACTERISTICS OF MEAT FROM RABBIT

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INTRODUCTION

The domestic rabbit has a potential as an important animal for meat production. In fact the small body size, short generation interval, high reproductive potential, rapid growth rate, genetic diversity and ability to utilize forages and by-products as major diet components are characteristics which make rabbits suitable as meat (B. Singh et al., 1988; Cheeke, 1986; Raharjo et al., 1986; Holmes et al., 1984; Cheeke et al. 1980).

Current recommendations suggest crude protein (CP) levels of 16% for growth (N.R.C., 1977).

Spreadbury (1978), using a range of diets containing 10.4 to 25.5 CP, reported optimal performance at 15% CP. A reduced performance in fryer rabbits given 16% CP, when compared to performance from diets containing 19.21 and 22.0% CP, was reported by Romney and Johnston (1978). Sanchez et al. (1985) suggested that a general purpose diet for optimal production of both lactating does and growing fryers should contain approximately 19% CP. The variation in these recommendations is apparently due to differences in protein quality (Nordio, 1985). Different types of protein supplements that often vary in price area available (Proto 1980). Since protein is the most expensive major ingredient in rabbit rations per unit weight, benefits derived from feeding higher levels of protein must be compared against the increased cost of production before recommendations can be made. The purpose of this study was therefore to compare two le-

vels of dietary protein and three remating intervals on carcass composition and sensory characteristics.

MATERIALS AND METHODS

Eight-four New Zealand White rabbits of both sexes, four weeks of age, were allotted in equal number to two groups on the basis of protein levels (16.8 and 18.2 %) and fed until they reached a mean weight of 2.500 Kg, predesignated weight of slaughter. The rabbits were born from does mated at three different times: intensive (remating 2-4 day "post-partum"); semi-intensive (remating 8-12 day "post-partum"); normal (remating 31-32 day "post-partum"). Rabbits to be used in this study were fasted for approximately 24 h before slaughter. The carcasses were chilled for 24 h at 0° C and afterwards were cut to obtain the forequarter, the loin and the hindquarter (Lukefah et al., 1982; 1983), these were used for determining percent separable of lean and bone.

In a previous report (Manchisi et al., 1986) are indicated the data about conformation and measurements of carcasses.

The longissimus muscles were frozen and stored (-20 °C) for 30 to 40 days until testing. Sensory evaluation of tenderness, juiciness and flavor of cooked longissimus was conducted (Holmes et al., 1984), and also using a Warner-Bratzler Instrument, shear values were determined. Before all testing, frozen meat was defrosted overnight at 5° C and cooked at 175° C to 75° C internal temperature. Panelist evaluated tenderness (1 = least tender, 6 = most tender), juiciness (1 = least juicy, 6 = most juicy) and flavor (1 = least meat flavor, 6 = most meat flavor) of the cooked longissimus. Data were analyzed by least squares procedure (Harvey, 1975) assuming a mathematical model that include fixed effects of protein level, sex and remating

interval. Differences among means were tested for significance using the protected least significant different procedures (Steel and Torrie, 1980).

RESULTS

The percentage of the lean and bone for the hindquarter, loin and the forequarter, are given in tables 1, 2 and 3.

The hindquarter composition (table 1) is not affected by dietary protein level or sex. The remating interval influenced the lean and the bone in rabbit "normal" ($P < .05$). The forequarter and the loin (table 2 and 3) were not affected from statistical significance. However there were trends for more lean in the male compared to female.

Table 4 showed the results about sensory evaluation and shear. The cooked longissimus from rabbits fed 18.2% of protein was more tender ($P < .05$) and there are more cooking losses. Between the sex, the females showed the same trend with more cooking loss and the shear value higher ($P < .05$). The tenderness, juiciness and flavor were not significantly influenced by any parameters. Differences in carcass bone percentages, meat to bone ratio and cooking loss percentage (an indication of lipid and moisture content of muscles tissue) may reflect differential rates of approach to physiological maturity (Lukefahr et al., 1983).

CONCLUSION

Further studies must be done on the influence of diet on cuts of carcasses and quality sensory. Differences in percentage of meat in the cuts were small, meat to bone ratio was improved only in loin cut, in fact percentages of bone in forequarter and hindquarter cuts were higher.

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TABLE 1. EFFECT OF LEVEL OF DIETARY PROTEIN, REMATING INTERVAL AND SEX ON HIND QUARTER COMPOSITION

Item	LEAN	BONE	LEAN/BONE
<u>PROTEIN, %</u>	(%)	(%)	
16.8	79.6 \pm 3.4*	20.4 \pm 3.4	3.9 \pm 1.4
18.2	79.7 \pm 2.5	20.3 \pm 2.5	3.9 \pm .9
<u>REMATING INTERVAL</u>			
Intensive ¹	80.0 \pm 2.3 ^{ab}	20.0 \pm 2.3 ^{ab}	4.0 \pm 2.3 ^{ab}
Semi-intensive ²	78.1 \pm 3.5 ^a	21.9 \pm 3.5 ^a	3.6 \pm 1.1 ^a
Normal ³	80.9 \pm 2.4 ^b	19.1 \pm 2.4 ^b	4.2 \pm 1.0 ^b
<u>SEX</u>			
Males	80.4 \pm 3.1	19.6 \pm 3.1	4.1 \pm 1.2
Females	79.0 \pm 2.6	21.0 \pm 2.6	3.8 \pm 1.1

¹ 2-4 day post-partum; ² 8-12 day post-partum; ³ 31-32 day post-partum.

a, b : P < .05.

* Mean \pm SD.

Table 2. EFFECT OF LEVEL OF DIETARY PROTEIN, REMATING INTERVAL AND SEX ON FORE QUARTER COMPOSITION

Item	LEAN	BONE	LEAN/BONE
<u>PROTEIN, %</u>	(%)	(%)	
16.8	72.0 \pm 2.8*	28.0 \pm 2.8	2.6 \pm .3
18.2	72.2 \pm 5.7	27.8 \pm 5.7	2.6 \pm 6.3
<u>REMATING INTERVAL</u>			
Intensive ¹	71.5 \pm 3.1	28.5 \pm 3.1	2.5 \pm .4
Semi-intensive ²	72.3 \pm 7.1	27.7 \pm 7.1	2.6 \pm 8.1
Normal ³	72.6 \pm 2.4	27.4 \pm 2.4	2.6 \pm .4
<u>SEX</u>			
Males	72.0 \pm 3.3	28.0 \pm 3.3	2.6 \pm .4
Females	72.1 \pm 5.7	27.9 \pm 5.7	2.6 \pm 6.6

¹ 2-4 day post-partum; ² 8-12 day post-partum; ³ 31-32 day post-partum.

* Mean \pm SD.

Table 3. EFFECT OF LEVEL OF DIETARY PROTEIN, REMATING INTERVAL AND SEX ON LOIN COMPOSITION

Item	LEAN	BONE	LEAN/BONE
<u>PROTEIN, %</u>	(%)	(%)	
16.8	85.6 ⁺ -1.9*	14.4 ⁺ -1.9	5.9 ⁺ -1.0
18.2	85.6 ⁺ -2.2	14.4 ⁺ -2.2	5.9 ⁺ -1.1
<u>REMATING INTERVAL</u>			
Intensive ¹	85.2 ⁺ -2.3	14.8 ⁺ -2.3	5.7 ⁺ -1.1
Semi-intensive ²	86.1 ⁺ -1.8	13.9 ⁺ -1.8	6.2 ⁺ -1.0
Normal ³	85.6 ⁺ -2.0	14.4 ⁺ -2.0	5.9 ⁺ -1.0
<u>SEX</u>			
Males	86.0 ⁺ -2.0	14.0 ⁺ -2.0	6.1 ⁺ -1.1
Females	85.2 ⁺ -2.0	14.8 ⁺ -2.0	5.8 ⁺ -1.0

¹ 2-4 day post-partum; ² 8-12 day post partum; ³ 31-32 day post-partum.

* Mean[±]SD

Table 4. MEAN VALUES OF QUALITY CHARACTERISTICS OF COOKED LONGISSIMUS FROM RABBITS FED TWO LEVEL OF PROTEIN AND THREE REMATING INTERVAL

Item	SHEAR	TENDERNESS	JUICINESS	FLAVOR	COOKING LOSS ^S
<u>PROTEIN, %</u>	(Kg)				
16.8	1.13 ⁺ .1 ^{a*}	4.2 ⁺ .5	3.8 ⁺ .4	4.2 ⁺ .6	20.4 ⁺ -5.6 ^a
18.2	1.00 ⁺ .1 ^b	4.4 ⁺ .4	3.8 ⁺ .3	4.2 ⁺ .3	22.7 ⁺ -5.8 ^b
<u>REMATING INTERVAL</u>					
Intensive ¹	1.05 ⁺ .1	4.2 ⁺ .3	3.9 ⁺ .2	4.2 ⁺ .4	21.2 ⁺ -7.0
Semi-intensive ²	1.07 ⁺ .1	4.3 ⁺ .5	3.8 ⁺ .5	4.1 ⁺ .5	22.8 ⁺ -4.3
Normal ³	1.07 ⁺ .1	4.4 ⁺ .4	3.7 ⁺ .3	4.2 ⁺ .4	21.0 ⁺ -5.7
<u>SEX</u>					
Males	1.03 ⁺ .1	4.3 ⁺ .4	3.7 ⁺ .4	4.1 ⁺ .4	21.2 ⁺ -4.7
Females	1.11 ⁺ .1	4.3 ⁺ .4	3.9 ⁺ .3	4.2 ⁺ .5	22.2 ⁺ -6.7

¹ 2-4 post-partum; ² 8-12 day post-partum; ³ 31-32 day post-partum.

a, b : P < .05.

* Mean [±]SD