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FATTENING PERFORMANCE AND CARCASE QUALITY IN THE RABBIT IN DEPENDENCE ON THE FINAL FATTENING WEIGHT AND THE FATTENING METHOD

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Introduction

Rabbit meat production is characterized by a considerable variation of fattening intensity. This is caused by differences in quantity and concentration of nutrients in the feedstuffs available. Up to now, these differences in the intensity of feeding and in the arrangement of rations are considered neither in a different final fattening weight nor in the reports on carcase quality.

Materials and methods

Test A: A total of 60 New Zealand White rabbits, weaned at an age of 25 days, were alloted to 4 test groups per 15 animals (8 males, 7 females), as follows:

1. Final fattening weight 1,8 kg
2. Final fattening weight 2,2 kg
3. Final fattening weight 2,6 kg
4. Final fattening weight 3,0 kg

The animals were housed individually.
At the 28. day of life, the test started. The animals were fed on pelleted all-mash feed, ad libitum. To avoid dysentery (Schlolaut, Lange, 1979), during the first three weeks of the experiment an all-mash feed with lower energy content was provided. The content of digestible energy (DE) was 11,05 MJ and 11,97 MJ/kg feed, respectively. Water was provided ad libitum by automatic nipple waterers.

At the final fattening weight of each particular group of weight the animals are fasted for 18 hours, at free water consumption, and then were slaughtered. After 24 hours of cooling, the carcases were weighed again. To the carcase belonged the head, but not the liver, lungs, heart and kidneys. Then, the cutting was done corresponding to the cutting method of the German Agricultural Society (DLG).

To determine the edible amount of the carcase, muscles and fat were detached from the bones except from the head. Together with the edible intestines (lungs, liver, heart, kidneys), muscles and fat were minced while frozen. From the defrosted mixture, the single samples were taken from 10 animals of each group of weight, for the determination of the nutrient content by means of the Weender-analysis. Up to the end of the test, 10 test animals (i.e. 16,6 %) died of dysentery.

Test B: A total of 80 young New Zealand White rabbits, weaned at an age of 25 days, were distributed after weaning to 8 groups of one sex each (4 male and 4 female groups), each group containing 10 animals. The animals were fed on green forage, as follows:

1. and 2. week of test: Subterraneum clover (Trifolium subterraneum)
3. to 9. week of test: Red clover (Trifolium pratense), before blossom
9. and 10.week of test: Egyptian clover (Trifolium alexandrinum)
11. to the end of test: Green rape (Brassica napus) "Akela".

In addition, 30 g of moist crumbled wheat bran were provided per animal and day. Water from automatic nipple waterers and sodium chloride in the form of a mineral block were fed ad libitum. Per group of weight 10 male and 10 female animals, respectively, were slaughtered at reaching the same final fattening weight as pointed out in test A.
One animal (1,7 %) died of dysentery.

Results

At fattening on green forage (B), daily gains (table 1) were 54 % to 60 % lower than at feeding on concentrates (A). At increasing final fattening weight, differences between both of the feeding groups decrease only inconsiderably. Evidently, there are restricted limits set to the compensation of lower nutrient concentration in the green forage by means of the bigger capacity in the digestive organs of older animals.

At fattening on green forage, daily weight gains were less than 50 % compared to fattening on concentrates. So, they exceed considerably the data of 2 - 8 g/day, determined by McNitt (1980). Obviously, potential performances also depend on the palatibility of the green forage provided. At palatability tests (Schlolaut, et.al., 1981), the forage plants used in the present test effected the highest intake rates of dry matter/day.

With increasing fattening weight the relative weight loss after fasting is higher in A and lower in B.

The weight of the pelt (table 2) is higher in A than in B. This is mainly explained by the fat sticking to the skin. The weight of the offals in group B is 6,1 % to 33,5 % higher than in A. At higher body weights, the difference between the two groups reveals an increasing tendency.

At forage feeding (B) the carcase dressing percentage is 3,8 % - 6,9 % less than on concentrates (A), except for weight-group 1. This is due to the higher amount of non-edible intestines, which could not be compensated by the lower weight of fat and the higher amount of edible intestines being higher in the weight-gropus 3 and 4.

The weight of the head (table 3A) points out a decreasing tendency at increasing final fattening weight and was higher in B than in A. The amount of back and flank was lower in B, and that of the haunches was higher. Compared to A, the amount of kidney fat in B was lower up to 90 %. Even in weightgroup 4 at fattening on green forage (B), kidney fat weight data, as noted in weight-group 1 at fattening on concentrates (A), could not be reached. The different final fattening weight had no significant influence on the relative amount of middle neck with shoulders and of haunches.

The edible amount of the carcase differed only very slightly in the several weight-groups of A. In B, there was an increasing tendency to be seen. All weight-groups showed a smaller edible amount in B than in A.

The analysis of the nutrient content in the edible amount of the carcase and edible intestines (lungs, liver, heart, kidneys) (table 3B) showed a decreasing water content at increasing weight. At fattening on concentrates (A), the water content decreases on a lager scale than at fattening on green forage (B). By this, the difference between the two feeding-groups, concerning the water content, grows larger. At protein content in the edible parts being only slightly increased (2 %), the water content being up to 10 % higher in the carcases of group B, is to be related nearly exclusively to the lower fat content, which was about 2 % in weight-group 1 and rises to 4 % in group 4. In contrast to this, fat content at fattening on concentrates (A) is 4 to more than 5 times as high (11 - 17 %).

The differences between the feeding-groups are highly significant ($p < 5$ %).

Thus, low energy carcase quality, having been adjudged to the rabbit up to now, only applies to fattening on forage or to strong reduction of feed intake (50 - 60 % of ad libitum intake) at feeding on pelleted concentrates (Schlolaut, et.al., 1978). Concerning the energy content, the edible amount of the New Zealand White rabbit carcase in feeding-group A, at a slaughter weight of 2,6 - 3,0 kg, is nearly equivalent to fat veal and to duck meat (Niinivara and Antila, 1972).

The lower fat content in the carcases of group B offers the possibility to realize a higher final fattening weight at fattening on forage. By this, the lower reproduction performance at extensive production conditions might, at least partly, be counterbalanced.

Unfortunately, there are not known any other investigations on the protein and fat content in the edible amount of the rabbit's carcase. Published data relate either to whe whole animal, without entrails (de Blas et.al. 1978) or to investigations on carcase parts (Rudolph, et.al., 1975). So, further investigations, effected as well with other populations, would be necessary to make generally valid assertions.

Differences in carcase compound, dependend on the feeding method, are related directly to the daily weight gains, which depend on the extent of nutrient intake. The data determined at fattening on green forage (group B) approximately correspond to data acquired at feeding on pelleted all-mash feed, when feed intake of this is reduced to 60 % of ad libitum intake (Schlolaut, et.al., 1978). Against that the lower carcase dressing percentage is due to a specific effect of green forage feeding.

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Summary

1. Rabbits of the New Zealand White breed were fattened from 4 weeks of age onwards to the final fattening weights, as follows: 1,8 kg (1); 2,2 kg (2); 2,6 kg (3); 3,0 kg (4). They were fed ad libitum either on pelleted all-mash feed (A) or on green forage (B). Group B was fed additionally with 30 g wheat bran/animal and day.

2. Daily weight gains of 16 - 18 g in group B were about 54 - 60 % lower than in A. Regarding the net weight gains (on the average 21 g, in Group A to 8 g/day, in Group B), the difference between the 2 feeding-groups increased. This resulted from a lower carcase dressing percentage in group B with an average of 53,9 % to 58,9 % in group A.

3. At cutting, the animals of group B revealed a higher amount of head and haunches than those in group A. In contrast, the amount of back with flanks and of kidney fat was higher in group A. At increasing weight, the relative amount of the head lowered and the relative amount of kidney fat rose. In group A, the edible amount of the carcase was at an average of 3,1 % (77,6 % : 80,7 %) higher than in group B. This difference resulted from the bigger share of bones and gristle.

4. The water content in the edible share of the carcase and intestines was 7 - 10 % higher in group B than in group A (A: 63 - 68 %; B: 73 - 75 %). The difference enlarged at increasing weight, as in A the water content decreased more than in B. The protein content (18 - 21 %) in B was an average of 2 % higher than in A and was hardly influenced by the weight. The fat content was 4,0 - 5,5 times higher in A than in B (A: 11 - 17 %; B: 2 - 4 %).

Table 1

FATTENING PERFORMANCE

Weight-group		1				2				3				4			
Feeding-group		A		B		A		B		A		B		A		B	
Number of evaluated animals		13		15		14		15		12		15		11		14	
		$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v
Final fattening weight	g	1915	7,1	1821	2,6	2318	4,6	2203	0,6	2687	3,5	2605	1,1	3058	3,7	3012	2,1
Age at slaughtering	days	61	6,9	109	6,2	70	9,7	122	3,1	79	9,3	147	8,8	91	8,9	166	8,4
Average daily gain	g	40	12,4	16	4,7	40	8,3	18	3,1	41	9,2	17	9,7	39	10,9	18	8,6
Weight loss after fasting	%	6,2	35,2	6,4	31,8	5,9	19,8	6,7	26,7	6,0	25,7	3,6	68,3	6,7	27,2	4,6	33,9
Average daily net weight gain (related to carcase and edible intestines*)	g	20	9,6	7	7,7	23	5,5	8	6,9	23	7,3	8	8,0	23	9,6	9	9,6

*minus 330 g corresponding to carcase and edible intestines at beginning of test.

Table 2

CARCASE DRESSING PERCENTAGE

Weight-group		1				2				3				4			
Feeding-group		A		B		A		B		A		B		A		B	
		$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v
Slaughter weight	g	1795	6,0	1704	3,8	2181	4,4	2055	2,0	2525	4,1	2512	2,8	2851	2,9	2874	3,0
Weight of warm carcase	g	924	3,8	842	5,0	1238	6,3	1013	4,2	1439	5,2	1236	3,1	1687	4,8	1481	6,3
Weight of cooled carcase	g	886	2,1	815	5,1	1193	5,8	986	4,6	1382	5,8	1199	3,1	1610	5,1	1440	6,5
Cooling loss*	%	4,1	12,0	3,2	38,3	3,6	22,0	2,7	20,7	4,0	24,3	3,0	32,9	4,6	27,2	2,8	27,0
Weight of cooled carcase, relative to slaughter weight	%	49,4	1,7	47,8	5,1	54,7	5,1	48,0	4,1	54,7	3,8	47,7	3,4	56,4	3,3	50,1	5,3
Liver	g	62	13,7	61	13,4	77	19,8	73	9,6	79	22,6	99	19,0	88	16,3	111	12,3
Heart, lungs, kidneys	g	33	17,9	32	10,5	43	7,9	36	7,5	46	7,0	40	11,3	50	10,9	45	9,9
Edible intestines, total	g	95	11,7	93	9,9	120	14,8	109	7,6	125	15,0	139	15,0	138	13,1	156	7,6
Carcase dressing percentage (cooled carcase and edible intestines, relative to slaughter weight)	%	54,7	2,0	53,3	4,0	60,2	5,2	53,3	3,5	59,6	3,8	53,3	3,3	61,3	2,9	55,5	4,6
Pelt	g	294	8,7	244	10,5	358	6,9	279	6,8	412	9,0	376	9,5	470	6,2	454	10,4
Offals	g	482	9,3	525	10,8	465	14,9	654	7,4	549	13,1	761	8,3	556	9,9	783	12,7

*Cooling at 5°C for 24 hours.

Table 3

A. CARCASE PARTS, AMOUNT OF DIFFERENT TISSUES

Weight-group		1				2				3				4			
Feeding-group		A		B		A		B		A		B		A		B	
		$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v	$\bar{x}$	v
Cutting parts																	
Head	%	9,3	6,3	10,3	6,3	8,1	7,8	9,5	5,8	7,6	10,6	9,1	5,8	7,0	5,8	8,6	8,2
Shoulders + forelegs	%	22,9	6,5	24,3	5,5	23,8	3,6	23,7	2,5	23,4	9,6	24,0	4,2	23,1	4,3	24,3	7,1
Back and flanks	%	32,6	4,9	28,9	5,1	32,7	4,3	29,5	3,9	31,6	8,0	29,4	4,2	33,5	3,7	30,0	7,0
Haunches	%	33,4	3,0	36,3	6,4	33,2	3,1	37,1	2,9	34,4	9,5	37,2	3,1	32,7	4,4	36,4	2,9
Kidney fat	%	1,8	28,2	0,2	62,0	2,2	33,6	0,2	99,0	3,0	26,1	0,3	75,8	3,7	32,2	0,7	51,5
Amount of tissues in the carcase, without head:																	
Meat, fat, tendons (edible carcase parts) and intestines	%	81	2,6	77	2,9	80	2,8	77	3,0	82	3,6	78	2,2	82	2,8	80	2,5
Bones and gristle	%	19	11,1	23	9,4	20	10,6	23	9,8	18	2,3	22	7,5	18	7,1	20	9,7

B. NUTRIENT CONTENT OF EDIBLE CARCASE PARTS AND OF OFFALS

Water	%	68	2,6	75	7,0	67	2,7	74	4,8	65	4,8	74	5,5	63	4,0	73	6,6
Crude protein	%	19	7,9	21	3,4	19	6,9	21	3,9	19	10,8	21	6,2	19	8,4	20	8,1
Crude fat	%	11	12,7	2	36,4	12	12,4	3	36,3	14	14,2	3	34,0	17	10,2	4	45,5

Crude protein	%	19	7,9	21	3,4	19	6,9	21	3,9	19	10						
Crude fat	%	11	12,7	2	36,4	12	12,4	3	36,3	14	14						

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