

Carcass quality and water in some muscles of Chincilla rabbit fed with substratum which remained after the production of Pleurotus pulmonarius mushrooms

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SUMMARY: A research has been done on how the feeding of Chincilla rabbits with micelium substrate mixture (which remains after Pleurotus pulmonarius mushrooms' production) can affect the weight of the carcass and organs, dressing percentage, pH value during 120 hours post mortem and water characteristics in m.longissimus dorsi and m. biceps femoris. After 9 weeks of feeding (test) the rabbits in A group obtained slaughter weight of 1336 g, in B group 1260 g and in C group 1362 g. The dressing percentage for A group was 51,8%, for B group 51,3% and for group C 51,8%. Commercial parts of the carcass (except the loin-ribs-stomach part and stomach fat) and the organs tested did not differ significantly among the groups ($P > 0.05$). The pH value trend during 120 hours post mortem was in both muscles regular and very similar in all three groups. Significantly smaller quantity of stomach fat and the loin-ribs-stomach part ($P < 0.05$) and significantly higher pH_{24} in m.longissimus dorsi of the rabbits of B group is the result of non-infectious mucous enteritis. After the experiment has been finished, a general conclusion can be drawn that the feeding of Chincilla rabbits with micelium straw mixture did not affect the parameters researched.

INTRODUCTION: Genetic basis is one of the essential, in fact one of the most significant factors upon which depends the efficiency of nutritive, slaughter, health and other results of domestic animals' fattening. The quality and methods of feeding also play important roles in the constitution and health condition of animal and consequently in the quality of meat and post mortem processes. This is why many a research (Hartley 1987, Božac et al. 1990) has been done on increment, feed efficiency, the state of health, the quality carcass and meat and post mortem processes in the meat of animals fed with micelium straw mixture which remains after the production of Pleurotus pulmonarius mushrooms. By well-balanced feeding (Ouhajoun et al. 1986) obtained higher increment of rabbits' body mass and better dressing percentage as a result of the changes of relative growth of certain tissues in the carcass. Božac et al. (1990) found out generally lower concentration of hydrogen ions (pH_{24}), in m.semitendineus, m.triceps and m.longissimus dorsi muscles of the rabbits who consumed food with 20% micelium straw mixture. In comparison to other groups they also found out significantly lower concentration ($P < 0.05$) in m.longissimus dorsi. Nevertheless, the same rabbits had significantly larger number of leucocytes in blood. According to Rupić et al. (1990) higher number of leucocytes in blood is the consequence of non-infectious mucous enteritis of rabbits which for the lack of crude fibre in feed, pulcked and consumed hairs. Lebas et al. (1978) and Gioffre et al. (1988) fed New Zeland's rabbits with different quantity of straw treated with 2,5% NaOH and no significant difference between the final weight and dressing percentage was found. Jensen et al. (1986) also did not find significant differences in the quality of meat when the rabbits were fed in a similar way, with the straw treated with NaOH. On the other hand, the meat of third generation's rabbits which were fed with 25% of treated straw, had significantly weaker smell. The rest of the substrate (micelium straw mixture) which remains after the production of Pleurotus pulmonarius mushrooms is a new and not well-known fodder but it already shows great potentials as feed for rabbits and other domestic animals. This study is a part of complex research into how the substrate in feed influences the production characteristics, the quality of carcass and meat of the rabbits.

MATERIALS and METHODS: The experiment went on in three groups (A, B, C) with a repetition. Each group consisted of 10 ablated Chincilla rabbits. The average weight of the rabbits was 66,62 dag and they were fed ad libitum with pelleted fodder mixtures and 10%, 20%, 30% micelium straw mixture which remains after Pleurotus pulmonarius mushrooms' production. Clean, pasteurized weat straw was sowed by Pleurotus pulmonarius micelium and it was incubated

in polyvinyl bags at 22°C. In the production course of 45 days, 20% mushrooms were picked up from micelium straw mixture. The rest of the mixture was dried, powdered into flour, mixed with other fodder and pelleted. After 9 weeks, the rabbits were slaughtered and dealt with in a normal slaughter procedure. The organs and carcass were examined by the vet, slaughter weight was scaled and dressing percentage was calculated. The slaughter weight (except the kidneys) did not include breast, stomach and pelvis cavities organs, skin, the head decapitated between os occipitale and atlas and lower parts of legs (A. carpi and A. tarsi). The ham, separated by a cut between os sacrum and last lumbal vertebra, back-loin joint (cut between the 6th rib and os sacrum), were set aside as commercial parts. The shoulder-joint, stomach fat, liver, heart, kidneys, lungs and wind-pipe have been weighed separately. Every 24 hours up to 120 hours post mortem at 4°C, the pH₁ and pH₂₄ were measured in m.biceps femoris and m.longissimus dorsi by means of pH/°C Meter-P-520 "Indunorm". Eventually, 48 hours after the slaughter, total water, pressed fluid (free water) and water binding capacity were determined in m.longissimus dorsi and m.biceps femoris. Total water was determined by maintaining 105°C until constant weight was obtained. Pressed fluid (free water) was determined by weighing the meat sample before and after pressing (200 g). Water binding capacity of a homogenized sample by centrifugal method of 4000 rpm/10 minutes.

RESULTS and DISCUSSION: The statistic analysis of slaughter results and the organs of Chincilla rabbits' carcass (table 1) shows significant difference in the quantity of stomach fat and consequently, a significant difference in the weight of the breast part between the B and C groups ($P < 0.05$). The reason for significantly lower quantity of stomach fat in the carcasses of B group rabbits was non-sufficient quantity of crude fibre in their feed (Božac et al. 1990). Consequently, those rabbits plucked and consumed hairs and that caused non-infectious mucous enteritis and increased the leucocytes in blood (Rupić et al. 1990). In the seventh week of the feeding process, those rabbits quickly lost their weight which was also the basic reason for non-significantly lower slaughter weight, dressing percentage, hams, back-loin joint, loin-ribs-stomach part, shoulder and liver.

Table 1: Statistical analysis of slaughter parameters of Chincilla rabbits' carcasses

Group	A			B			C			$P \leq 0.05$
	n	\bar{x}	V	n	\bar{x}	V	n	\bar{x}	V	
Slaughtering weight (g)	9	1336	22.6	10	1260	11.9	9	1362	6.3	$P > 0.05$
Dressing percentage (%)	9	51.8	5.3	10	51.3	3.6	9	51.8	2.7	$P > 0.05$
Stomach fat (g)	9	36.7	53.0	10	32.2	41.8	9	48.0	27.0	$P < 0.05$ B:C
Hams (g)	9	502.1	21.0	10	486.6	11.6	9	501.9	5.4	$P > 0.05$
Back-loin joint (g)	9	417.2	25.1	10	378.1	14.4	9	416.2	7.0	$P > 0.05$
Loin-ribs-stomach part (g)	9	358.3	22.4	10	341.8	9.1	9	379.7	8.2	$P < 0.05$ B:C
Shoulder (g)	9	92.0	21.7	10	87.1	11.0	9	93.6	7.7	$P > 0.05$
Liver (g)	9	72.5	18.3	10	67.0	16.2	9	71.0	18.2	$P > 0.05$
Heart (g)	9	7.5	32.7	10	6.2	17.0	9	5.8	8.1	$P > 0.05$
Kidneys (g)	9	19.5	17.7	10	18.1	17.2	9	18.1	17.1	$P > 0.05$
Lungs and wind-pipe (g)	9	19.7	19.9	10	21.3	31.3	9	20.9	18.9	$P > 0.05$

Table 2: The water in m.longissimus dorsi and m.biceps femoris of Chincilla rabbit

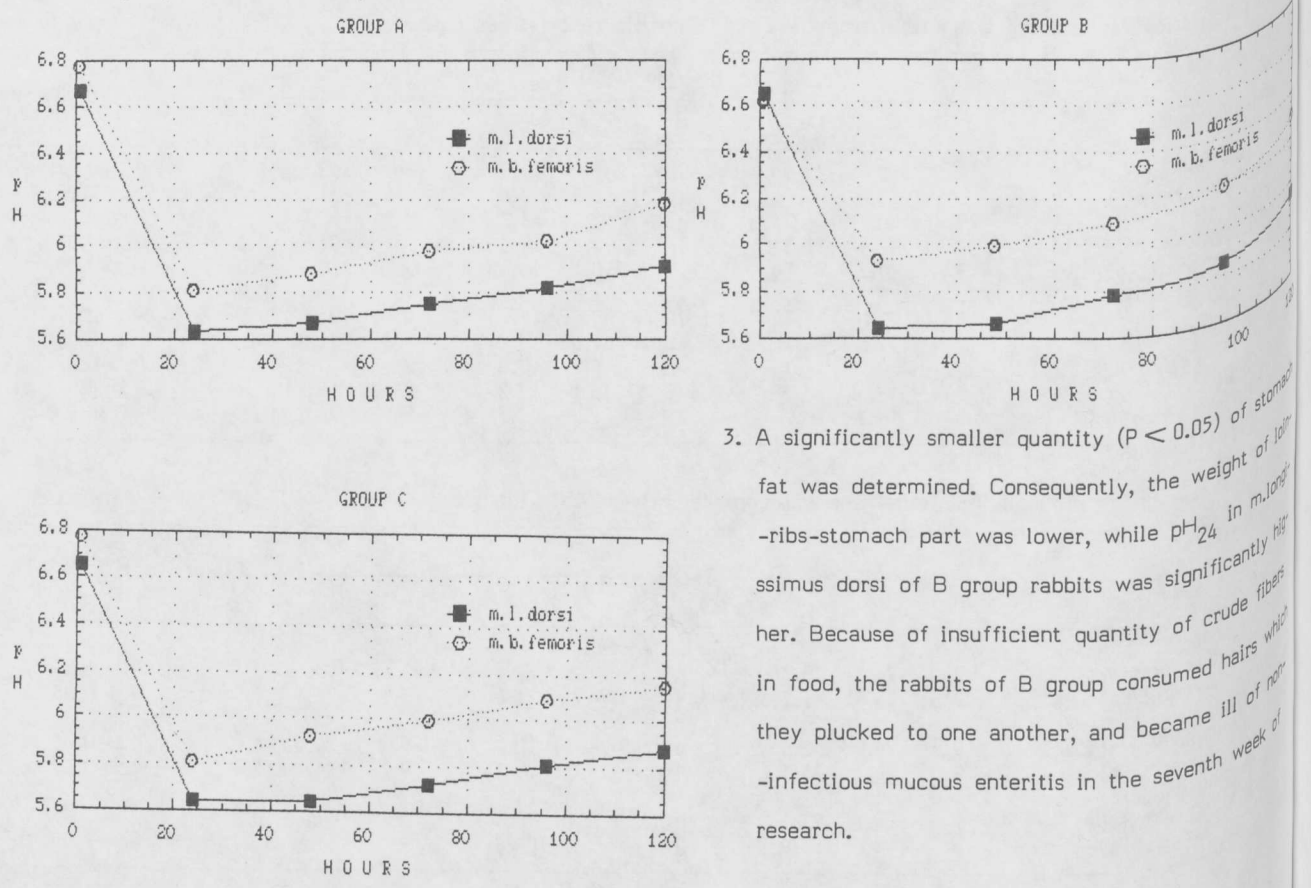
Group	A			B			C			$P \leq 0.05$
	n	\bar{x}	V	n	\bar{x}	V	n	\bar{x}	V	
Total water in:										
- m.longissimus dorsi (%)	9	74.3	3.2	10	74.2	1.4	9	73.9	2.2	$P > 0.05$
- m.biceps femoris (%)	9	75.7	1.7	10	76.1	1.1	9	75.1	0.9	$P > 0.05$
Pressed fluid in:										
- m.longissimus dorsi (%)	9	26.9	32.6	10	28.0	18.7	9	29.5	14.0	$P > 0.05$
- m.biceps femoris (%)	9	24.5	23.3	10	25.0	17.2	9	24.4	17.7	$P > 0.05$
Water binding capacity in:										
- m.longissimus dorsi (%)	9	4.3	87.5	10	4.9	70.4	9	4.6	60.5	$P > 0.05$
- m.biceps femoris (%)	9	3.0	53.9	10	3.2	108.7	9	3.5	94.7	$P > 0.05$

The rabbits of B group had the highest pH taken 24 hours post mortem in both muscles. In fact, significantly higher pH_{24} was determined in m.longissimus dorsi of B group than in the same muscle of C group ($P < 0.05$). As pH value is an impartial indicator of meat quality, this kind of difference was to be expected because the rabbits of B group lost weight in the seventh week of the test and at the moment of slaughter they had increased number of leucocytes in blood. The total pH trend in m.longissimus dorsi during 120 hours post mortem has significantly lower course in relation to m.biceps femoris in all rabbit groups (Graph 1). This pH pattern in the course of 120 hours post mortem is normal and expected. Totally lower pH value in m.longissimus dorsi in all groups of rabbits tested is in accordance with greater activity of phosphorylase and increased glycogen in that muscle. Comparison between all three groups showed that in relation to m.longissimus dorsi, m.biceps femoris contained more total water, less pressed fluid (free water) and lower binding capacity (Table 2). However, not one characteristic of water investigated, showed non-significant difference between m.longissimus dorsi of A, B, C groups and m.biceps femoris of A, B, C groups ($P > 0.05$). The data show that m.longissimus dorsi of all the rabbits tested has smaller quantity of total water and therefore higher water binding capacity and lower water holding capacity.

CONCLUSIONS: After a research has been done on feeding Chincilla rabbits with 10%, 20% and 30% of micelium straw mixture which remains after the production of Pleurotus pulmonarius mushrooms, the following conclusions can be drawn:

1. The feeding of Chincilla rabbits with micelium straw mixture did not significantly affect their slaughter value, dressing percentage, the weight of hams, back-loin joint, shoulder and all the other organs ($P > 0.05$).
2. There was also no significant influence of feeding on total water, free water, water binding capacity and total pH trend during 120 hours post mortem in m.longissimus dorsi and m.biceps femoris ($P > 0.05$).

Graph 1: The trend of pH value in m.longissimus dorsi and m.biceps femoris during 120 hours post mortem in all three groups of rabbits - A, B & C



3. A significantly smaller quantity ($P < 0.05$) of stomach fat was determined. Consequently, the weight of joints -ribs-stomach part was lower, while pH_{24} in m.longissimus dorsi of B group rabbits was significantly higher. Because of insufficient quantity of crude fibers in food, the rabbits of B group consumed hairs which they plucked to one another, and became ill of non-infectious mucous enteritis in the seventh week of research.

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