IMPORTANCE OF THE GOAT SLAUGHTER AGE ON TECHNOLOGICAL PARAMETERS OF THEIR CARCASS

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Abstract

In this study we analyzed the evolution of technological parameters of goats carcass according to age. For this study we created two groups of samples, namely: group I represented by the goatling and group II represented by adult goats. On these meat samples we analyzed: meat chemical reaction (pH), water holding capacity, cooking loss test and drip loss (losses from refrigeration). For this samples we analyzed a total of 30 samples of goat meat for 15 for each group considered to be studied. Samples were collected from goats slaughtered during 2012 in a slaughterhouse in SE Romania. The values for the chemical reaction of the first group samples (goatling) varied between 6,20 and 6,32, the average being 6,26 and for the group II between 6,31 and 6,39, with an average of 6,35. Water holding capacity showed an average value of 61,23% for group I to 64,17% for group II. Cooking loss are recorded 37,62% to group I to 32,28% in group II, and for drip loss 4,06% for young kids to 4,88% to adult samples. Results lead to the conclusion that slaughtering goats at a younger age represents a disadvantage for manufacturing and processing, generating qualitative and quantitative losses in finished products.

Keywords: *goat meat, goat slaughter, public health risks*

INTRODUCTION

Goats represent a species of domestic animals with high biological, technological and economic flexibility. To support this statement there are several reasons, resulting in the ability of goats to use poor feed resources and rough surfaces, the possibility of integrating them into different rearing systems contributing to the fund of livestock products (meat, milk, hides and skins) and farms development is carried out without too much investment.

For goats rearing, cheap feeding resources are efficiently used, depending on the breeds' characteristics and their morpho-productive features.

Lately, consumer preferences for goat meat and dairy products made from goat milk have increased, due to the food traditions, animal protein deficiency in human diets worldwide, and the special nutritional qualities of these products.

Goat meat is a valuable food in human diet because it contains high quality protein and is rich in essential amino acids that can not be synthesized by the human body. Goat was and still is the main source of meat for the people of

South America, Africa or Asia, significantly exceeding the production and consumption of goat meat, lamb or sheep in Europe. Various studies show that this meat has a much stronger flavor, much higher nutritional and biological values compared to other kinds of meat, due to the specific proportion of the constituent trophins. If until recently the main sources of meat were pork and cattle, lately it was noticed an increased preference for poultry and fish compared to mammals, and of these the preference for goat meat (Tăpăloagă Dana, 2012). Poultry meat contains less fat than pork or beef, chicken liver is rich in vitamin A, and the proportion of unsaturated fatty acids is higher than the saturated ones, suggesting that birds may be an alternative to red meat.

Goat breeders' concerns should be directed towards increasing and improving meat quality and milk production, which can be achieved by encouraging breeds, populations and specialized lines for meat or milk production, by improving rearing technologies (Memisi N, Bauman F, 2007).

Establishing the relation between various production and the limits within which they can increase without prejudice the physiological balance represents an issue of major practical importance for increasing profitability in goats' husbandry.

It is still difficult to ensure a steady supply of goat meat for consumers. Due to the ignorance or other reasons, consumers are often faced with the purchase of meat that is not safe for their consumption due to potentially dangerous effects of low quality meat or meat substitutes (substitutions with reduced trade and nutritional value).

Imposing certain standards of sanitation (cleaning, sanitation) in slaughterhouses, in the processing circuit, handling, transportation and sale of meat is of great importance because meat is an ideal environment for the development and multiplication of microorganisms, especially bacteria, cited as causes in the etiology of zoonoses.

Between meat and milk production there is no physiological antagonism, but rather a low positive phenotypical correlation. However, even under good care and nutrition, meat and milk production can not be limitlessly increased in parallel.

Along with increased productions, the standards of feeding, fodder conservation, superior fodder capitalization must continually be improved, by ensuring a higher digestibility, the preparation of feed ratios based on nutritional requirements and ingestion capacity of different goats categories, in order to increase economic efficiency (Shrestha JNB, 2005).

In order to avoid specific health risks (sources of pathogens and food poisoning) it is necessary to provide optimal conditions for transport, slaughter, rapid refrigeration and proper handling of carcasses. Also it will be avoided long distance transport of animals, extended maintenance in slaughterhouses, brutally slaughtering, unclean instruments, and contamination during skinning, evisceration, cutting, chilling, storage and prepackaging.

MATERIALS AND METHODS

The pH value was determined by the potentiometric method using the device probe and meat aqueous extract from 10 g of shredded meat sample, adding distilled water up to the 100 ml capacity of the cylinder (AOAC, 2000). Solution was left to rest for 15 minutes, during which for 2-3 times was mixed with a glass rod, then the cylinder content was passed through the filter paper. The pH value was read on the device display.

Water-holding capacity was expressed as milliliters of sodium chloride for 100 grams of meat, following this protocol: from the sample were weighed 8 grams, this quantity being shredded and placed in test tubes. It was added a volume of 12 milliliters sodium chloride solution and then the content was mixed. The tubes were left to rest for 15 minutes at 5^{o}C then were centrifuged at 10000 rpm and 4^{o}C. By decantation it was separated the supernatant and it was measured and used to express the water-holding capacity (AOAC, 2000).

The cooking losses: there were used 100 grams from the analyzed meat sample, which were placed in a capped glass vial and were heated to 72^{o}C (temperature of the meat) on Julabo TW12 water bath. The liquid was removed and the solid portion was cooled and accurately weighed. Finally weight loss of analyzed meat samples was reported.

Drip loss was measured by the following working protocol: 100 grams from the analyzed meat sample were placed in a glass vial with cap and grid and were maintained at a temperature of 4^{o}C for 24 hours in a FTC Velp 90i cooling thermostat. After this, the sample was weighed and the obtained value was related with initial weight of the sample.

RESULTS AND DISCUSSIONS

pH values for examined goat meat samples are shown in Table no. 1 and Figure no. 1. It can be noticed that the pH recorded increasing. Lower values were recorded for samples in group I collected from goatlings and higher values for samples in group II collected from adult goats. The extreme pH figures recorded were 6,20 and 6,39 respectively, mean values being 6,26 for goatling and 6,35 for adult goats.

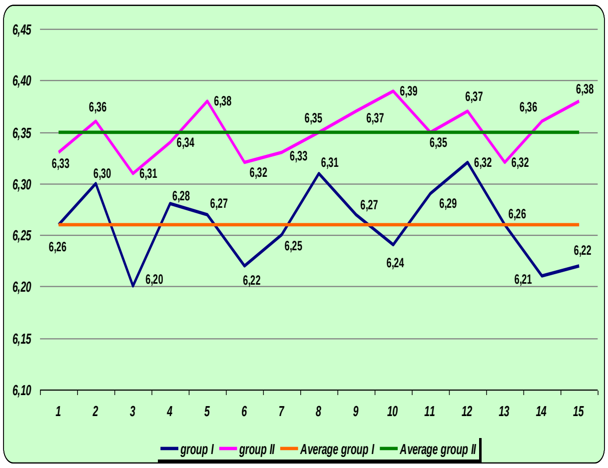
Table 1

Meat chemical reaction values

Sample no	Group I	Group II
1	6,26	6,33
2	6,30	6,36
3	**6,20**	**6,31**
4	6,28	6,34
5	6,27	6,38
6	6,22	6,32
7	6,25	6,33
8	6,31	6,35
9	6,27	6,37
10	6,24	**6,39**
11	6,29	6,35
12	**6,32**	6,37
13	6,26	6,32
14	6,21	6,36
15	6,22	6,38
Average	6,260	6,351

Figure 1

Meat chemical reaction graphic values



Water holding capacity recorded lower values in young animals meat and higher in adult animals'. As it can be seen from the data presented in Table no. 2 and Figure no. 2, goatling meat has a lower water holding capacity than the one from the adult group. Water holding capacity ranged from 60,28 to 62,18% (with an average value of 61,23%) for group I and from 63,65 to 64,69% (with an average value of 64,17 %) for group II.

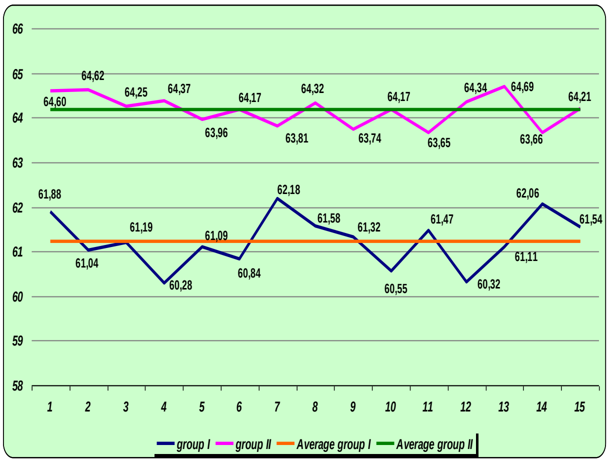
Table 2

Water holding capacity values

Sample no	Group I	Group II
1	61,88	64,60
2	61,04	64,62
3	61,19	64,25
4	**60,28**	64,37
5	61,09	63,96
6	60,84	64,17
7	**62,18**	63,81
8	61,58	64,32
9	61,32	63,74
10	60,55	64,17
11	61,47	**63,65**
12	60,32	64,34
13	61,11	**64,69**
14	62,06	63,66
15	61,54	64,21
Average	61,230	64,171

Figure 2

Water holding capacity graphic values



Cooking loss: after cooking different types of goat meat, depending on their age, there were recorded values shown in Table no. 3 and Figure no. 3. As it can be noticed, the effect of age on the meat cooking loss varied along with the two studied age groups. Cooking losses for meat from young animals (group I) was higher – 37,62% (from 34,76 to 40,48%), comparing with meat samples from group II (adult goats) – 32,28% (between 31,14 to 33,42%).

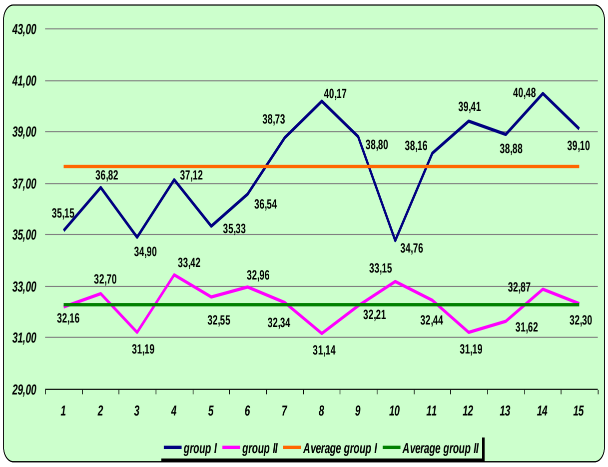
Table 3

Coking loss test values

Sample no	Group I	Group II
1	35,15	32,16
2	36,82	32,70
3	34,90	31,19
4	37,12	**33,42**
5	35,33	32,55
6	36,54	32,96
7	38,73	32,34
8	40,17	**31,14**
9	38,80	32,21
10	**34,76**	33,15
11	38,16	32,44
12	39,41	31,19
13	38,88	31,62
14	**40,48**	32,87
15	39,10	32,30
Average	37,623	32,283

Figure 3

Coking loss test graphic values



Drip loss: goat meat from the two age groups analyzed recorded values presented in Table no. 4 and Figure no. 4. Drip loss in the samples collected from young animals showed an average of 4,88% (min. 4,64% and max. 5,12%) and in the samples collected from adult animals an average of 4,06% (min. 3,82% and max. 4,30). Analysis of the obtained data indicated that the values for goatling were greater than the values for adult goats.

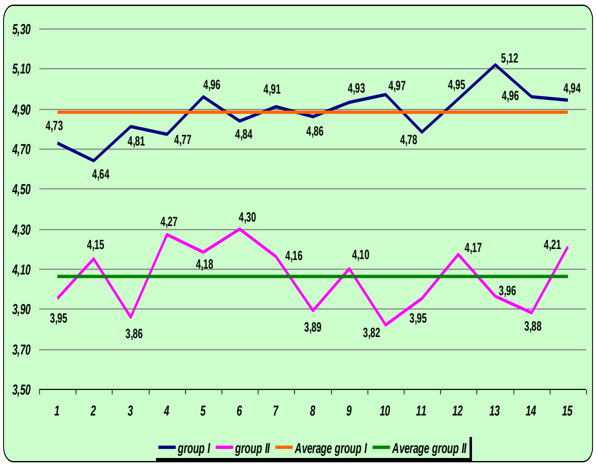
Table no. 4

Dip loss test values

Sample no	Group I	Group II
1	4,73	3,95
2	**4,64**	4,15
3	4,81	3,86
4	4,77	4,27
5	4,96	4,18
6	4,84	**4,30**
7	4,91	4,16
8	4,86	3,89
9	4,93	4,10
10	4,97	**3,82**
11	4,78	3,95
12	4,95	4,17
13	**5,12**	3,96
14	4,96	3,88
15	4,94	4,21
Average	4,878	4,057

Figure 4

Dip loss test graphic values



CONCLUSIONS

The results obtained from measurements presented in this study indicate the presence of minor differences between technological parameters of meat from goatling and meat from adult animals. These differences support the findings of other authors who have analyzed goat meat in terms of technological efficiency and who have not recommeded the slaughter of young animals because technological properties of the obtained raw material are lower compared with those obtained from slaughtered adult animals.

Water holding capacity is lower for young animals' meat compared with the one from adult animals, which makes the return in the products increase proportionally with the age of slaughtered goats.

It was noticed that cooking loss decreases with age from 37,62% in goatling to 32,28% in adult, which may be associated with the increasing of the pH from 6,26 to 6,35.

Drip loss recorded a significant decrease in adults' meat (4,06%) compared to the young animals' meat (4,88%), which could be associated with the observation that along with the age the sarcomeres are shortening and the myosin filaments are contracting, appearing grouped as bundles.

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