STUDY CONCERNING THE CHEMICAL COMPOSITION OF MEAT IN YOUNG TSIGAI SHEEP, RUSTY VARIETY

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Abstract

In last four years, Romania occupies the first place within the European countries concerning the number of exploited sheep heads, destined to slaughtering. Over 97 % of the volume of this export is represented by the Turcana young sheep, and difference of 3 % is represented by Tsigai young sheep. The emphasizing of the chemical composition of the meat from Tsigai young sheep Rusty variety fattened both on pasture and shelter is the aim of our paper. The determination of the chemical composition of the meat allows a deep analyze of its quality traits, making possible the evolutive characterization of the breed and the correlation between the breed and functional parameters of the used fattening system. The work methodology involved analyze of the chemical composition of the meat harvested from cutlet (Longissimus dorsi, LD) and muscle (Biceps femoris, BF), according to Weende pattern: water content, water, crude protein, crude fat, ash and non nitrogen extractives. The results obtained for the young sheep fattened on pasture in group exclusively fattened with green mass emphasize in L.D. a water content of 74.55 ± 0.19 %, dry matter of 25.46 ± 0.20 %, and group that received combined forage have water percent of 73.38 ± 0.21 % and dry matter a share of 26.62 ± 0.21 %; in B.F. water was between 74.81 – 74.57 %, and dry matter of 25.19 – 25.43 %. In group made up of young individuals fattened in shelters, the water content of L.D. is 62.44 ± 1.46 %, and dry matter of 37.56 ± 0.95 %; in B.F. water shares 66.88 ± 1.06 % and dry matter 33.12 ± 0.85 %. As general conclusion, we can afirm that the applied fattening technology significantly influences the chemical composition of the meat, and this imposes its correlation witrh the qualitative preferences of the consumers.

Kay words: cutlet, muscle, chemical composition, meat

INTRODUCTION

The sheep meat represents an aside category inside world meat production, because as concerns its qualities is considered meat with especial organoleptic and nutritive features. Besides physical and psycho-sensorial qualities the chemical composition recommends it in human alimentation because of high content in lysine and PUFA fatty acids, from which we mention CLA and LA [2]. The ruminants, among farm animal species, provide by the milk and meat 90% from CLA quantity from human food [1]. However, even these features make it special, the ovine meat consumption is different from a country to another one, the greatest one on world level being registered in Mongolia with about 65.20 kg/inhabitant head, in Europe the greatest consumption being registered in Island with 29.80 kg, and in our country that is traditionally in breeding and among the first four European countries producing ovine meat, the consumption is about of 2.90 kg of meat/inhabitant head [4].

From these reasons we approached such a theme that is part of an ample study concerning the ovine meat quality, to have data for the market help and to contribute for stimulation of this product consumption especially as concerns the culinary point of view and also the dietary-alimentary one.

MATERIAL AND METHOD

The biological material submitted for experiments was represented by ovine youth of Tzigaie breed, Rusty variety, as native breed characterized by a good adaptability to hill, and plateau zones, having a medium body development and being framed in the mixed morpho-productive type of semi-fine wool-milk-meat. The ovine youth derived from the force bred inside the former Research and Development Station for Meadows Jucu, Cluj County, in present being ovine sector inside Didactic Station of UASVM Cluj-Napoca.

The experimental design comprised two lots of ovine male youth fattened on pasture and a lot fattened in stalling, the young rams from the three experimental lots being half-brothers after father.

In the case of fattening on pasture were formed two lots, each of 10 heads, one of them being fed exclusively with green crop on pasture (**lot P**), and the other one (**lot P+C**) gets beside green crop also reduced quantities of concentrated fodder with different energetic and protein levels depending on fattening phase. The youth age in moment of experience beginning from the two experimental lots varied between 90 and 95 days with a body weight comprised between 21.62 ± 0.39 kg in case of lot P, and 21.82 ± 0.33 kg in case of lot P+C, and in the end of the 150 fattening days the lot P registered a body weight of 35.49 ± 0.11 kg, and the lot P+C a body weight of 39.44 ± 0.14 kg, in final the differences between the two lots being very significant (*** $p<0,001$). The lots' maintenance was done on a pasture appertaining to subtype *Festuca rupicola-Agrostis capillaris*, with an average productivity about 14940 kg green crop/ha, according the next experimental scheme (table 1). The concentrated fodder administration was done in the evening after animal arriving from pasture and the watering was done three times per day.

Table 1.
The scheme of maintenance manner of the two experimental lots

Phase	Duration days	Lot	Maintenance		
			pasture	Supplement of combined fodder	
				P.B.D. %	g/head/day
accommodation	20	P	yes	-	-
		P+C	yes	16,00	100
breeding-fattening	100	P	yes	-	-
		P+C	yes	16,00	150
Finishing	30	P	yes	-	-
		P+C	yes	14,00	200

In case of fattening in stalling (shelter section type with grate floor) was formed a single animal lot of 10 heads, these ones having the age comprised among 60 and 65 days and a body weight in fattening beginning moment of 15.14 ± 0.45 kg, and in final after 100 fattening days was registered a body weight of 39.20 ± 0.75 kg. The experimental period comprised three phases: accommodation phase of 15 days when the fodder without restriction was done with an unique mixture with 16% protein level; breeding-fattening phase of 65 days in which the protein level of unique fodder was of 15%; finishing phase of 20 days in which the protein level of unique fodder was of 13 %. The unique fodder was formed of combined fodder, hill hay and alfalfa hay in case of accommodation phase; combined fodder and hill hay in case of breeding-fattening phase; combined fodder, corn meal and hill hay in case of finishing phase. The feeding was done in two rations, one in the morning about 7^{30} hour, and the second one about 16^{00} hours, but can be considered without restriction because the feeding vessels never were empty, the refusals being eliminated and weighted in each morning. The water was provided without restriction by watering installation with constant level existent in each compartment.

In the end of the two fattening systems were chosen 5 heads of young fattened rams from each experimental lot, which were representative as concerns the body conformation point of view, the breed standard, but also of body weight to express the average of each lot, these ones being submitted for slaughtering and appreciation of meat production quantitative and qualitative features.

The meat chemical composition was determined basis on Weende scheme, establishing the proportion of water, of dry matter (SU), of crude protein (PB), of crude fat (GB), of crude ash (CB) and no-nitrogenous extractive substances (SEN). The dry matter was gravimetrically determined by using of drying stove, the crude fat by Soxhlet method, and crude protein by Kjeldahl method. The samples submitted for analysis were collected from chop region (muscle *Longissimus dorsi - LD*) and leg of mutton region (muscle *Biceps femoris - BF*).

The crude obtained data were statistically processed with help of WINSTATISTIC program.

RESULTS AND DISCUSSIONS

After the analyses effected on collected samples from the two regions in ovine youth fattened on pasture were obtained the next values of elements, which define the meat chemical composition, presented in table 2.

Table 2.
Chemical composition of meat in ovine youth of Tzigaie breed fattened on pasture - %

Region	Chemical composition	Lot	n	$\overline{X} \pm s_{\bar{x}}$	V %	d	Difference significance
Chop LD	Water - %	P	5	74,55 ± 0,19	0,59	1,17	**
		P + C	5	73,38 ± 0,21	0,64		
	S.U. -%	P	5	25,46 ± 0,20	1,75	- 1,16	**
		P + C	5	26,62 ± 0,21	1,78		
	P.B. - %	P	5	17,28 ± 0,04	0,60	- 0,88	***
		P + C	5	18,16 ± 0,02	0,28		
	S.E.N. - %	P	5	1,04 ± 0,01	3,04	- 0,08	ns
		P + C	5	1,12 ± 0,01	2,46		
	G.B. - %	P	5	8,32 ± 0,05	1,49	0,22	ns
		P + C	5	8,10 ± 0,21	5,84		
	Ash - %	P	5	1,07 ± 0,01	1,41	0,01	ns
		P + C	5	1,06 ± 0,08	1,70		
Leg of mutton BF	Water - %	P	5	74,81 ± 0,16	0,50	0,24	**
		P + C	5	74,57 ± 0,16	0,48		
	S.U. -%	P	5	25,19 ± 0,16	1,48	- 0,24	**
		P + C	5	25,43 ± 0,17	1,42		
	P.B. - %	P	5	17,25 ± 0,05	0,68	- 0,99	***
		P + C	5	18,04 ± 0,05	0,65		
	S.E.N. - %	P	5	1,05 ± 0,02	4,69	- 0,09	ns
		P + C	5	1,14 ± 0,01	10,00		
	G.B. - %	P	5	7,04 ± 0,01	0,41	0,25	*
		P + C	5	6,79 ± 0,07	2,37		
	Ash - %	P	5	1,05 ± 0,01	4,69	0,04	**
		P + C	5	1,01 ± 0,03	0,82		

ns = p > 0,050; * = p < 0,050; ** = p < 0,010; *** = p < 0,001

Analyzing the chemical composition as concerns the water and dry matter content in chop and leg of mutton comes out that the values are approximately equal in case of both experimental lots. There is observed that both in leg of mutton case and also in the chop one the differences as concern the content of crude protein between lot P and lot P+C are very significant, which allows us to affirm that pasture supplementation with a reduced quantity of combined fodder determines to accumulate in meat a greater protein quantity, and the

difference between fat quantities from the two analyzed lots is statistically uninsured in the chop case and significant in the BF muscle case.

The chemical composition of meat from chop region and from leg of mutton one in the lot fattened in stalling is presented in table 3.

Table 3.
Chemical composition of meat in ovine youth of Tzigaie breed fattened in stalling - %

Region	Chemical composition	$\overline{X} \pm s_{\overline{x}}$	V %
Chop LD	Water - %	62,44 ± 1,46	5,23
	S.U. -%	37,56 ± 0,95	5,66
	P.B. - %	21,33 ± 0,68	7,13
	S.E.N. - %	1,31 ± 0,08	13,66
	G.B. - %	11,51 ± 0,45	8,74
	Ash - %	3,41 ± 0,09	5,90
Leg of mutton BF	Water - %	66,88 ± 1,06	3,54
	S.U. -%	33,12 ± 0,85	5,74
	P.B. - %	18,97 ± 0,92	10,84
	S.E.N. - %	1,98 ± 0,04	4,52
	G.B. - %	9,15 ± 1,52	16,62
	Ash - %	3,02 ± 0,15	11,11

In case of ovine youth intensively fattened in shelter registered an higher content of dry matter in chop level comparatively with those one registered at leg of mutton level, the differences between the two regions being greater given to those ones registered in the pasture fattening case.

Comparing the two applied fattening systems comes out that the dry matter level is net superior for the intensive fattening system given to the pasture one, but the fat content is more reduced in the lots fattened on pasture both for the chop region and the leg of mutton one, fact which allow us to affirm that from this point of view the meat could be more appreciated by a consumer segment oriented on a reduced animal fat consumption, but which do not know detailed the content in unsaturated fatty acids of suet proceeded from ovine species. The content level in SEN in case of meat proceeded from animals submitted for fattening in the two systems has values approximately equal both for leg of mutton region and that of chop one, varying between 1.05 and 1.98 %.

CONCLUSIONS

Besides quantitative carcass characteristics, usually is also done the chemical analysis of meat proceeded from the mentioned two muscle regions *Longissimus dorsi* and *Biceps femoris*, because this one is tight linked of meat psycho-sensitive features' manifestation, features which are appreciated by the consumers for the meat evaluation, this appreciation leading implicitly to a market with culinary preferences extremely jumpy and very pretentious for the meat quality [3].

The water and dry matter proportion varies depending a lot of factors, from which an essential role is played by the breed and administrated fodder, besides the sample proceeding region and applied fattening technology. The completion of carcass tissue composition or structure with meat chemical composition analysis, with data concerning the meat sensory features and all these correlation, offer the adaptation possibility of technological system to obtain carcasses appreciated by consumers and the meat consumption increasing.

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