

## SLAUGHTER AND QUANTITATIVE CHARACTERISTICS OF THE MEAT FROM LAYING HENS

Elena JOSHEVSKA<sup>1</sup>, Mitre STOJANOVSKI<sup>1</sup>, Gordana DIMITROVSKA<sup>1</sup>, Katerina  
BOJKOVSKA<sup>1</sup>, Sasho TODOROVSKI<sup>2</sup>

<sup>1</sup>St. „Kliment Ohridski” University Bitola, Faculty of Biotechnical Sciences, Partizanska b.b, 7000,  
Bitola, Macedonia

<sup>2</sup>Poultry Farm „Zlatec” Bitola, Macedonia

Corresponding author email: ejoshevska@yahoo.com

### Abstract

*The aim of the research was to obtain comparative indicators of the slaughtering and quantitative characteristics of the laying hens from different hybrid lines. For the examination were used hybrid lines from ISA Brown, for gaining eggs with brown shell, and DeKalb, for gaining eggs with white shell. The total number of examined individuals is 40, 20 of each hybrid line, with an average age of 84 weeks. After the slaughter, the measurements of each carcass were made and the participation of the basic parts in the mass of the clean carcass was determined. The dressing percentage of clean carcasses without internal organs and skin of hens from the hybrid line ISA Brown is 49.80%, while the dressing percentage of chicken from the hybrid line DeKalb is 46.80%. The average mass of chests (white meat with bone) is 234.65 g in ISA Brown, or 26.95% in the mass of the carcasses, while in the DeKalb hybrid line the average mass of the chest is 197.20 g with 26.86% participation in the mass of carcasses.*

**Key words:** hybrid lines, slaughter, carcass, quality.

### INTRODUCTION

The poultry industry, which is mainly focused on egg production, shows constant development in the last twenty years, and the private individual farms which increase their activity in this sector are the greatest contributors.

The egg and broilers production in small family agricultural economies has long tradition and representation in the Republic of Macedonia and it is also a part of the rural heritage. In egg production part, the main goal is keeping the current situation of total self-sufficiency on the domestic market with domestic production through keeping and advancing of the domestic consumption.

According to data from (Official Gazette of R. Macedonia, 2015), the total number of laying hens is 1,352,564 and the average egg production per laying hen is 150.

In total production, 109,977 are from individual producers and 93,406 is a part of egg production in the business sector.

Total production of eggs in Pelagonija region is 37,291 - 8,767 eggs are produced by individual producers, and 28,524 eggs are produced by business entities.

Numerous hybrid lines are used for production of eggs for consumption. They are divided in two groups: heavy and light hybrid lines which differ by live weight. Heavy hybrid lines have bigger weight - above 1550 g, and the light hybrid lines weigh 1350 g (Todorovski, 2016). Despite the fact that the laying hens are, first of all, intended for egg production, still, they are being slaughtered for meat production after their exploitation. Meat from laying hens is used in meat industry for production of various types and kinds of sausages.

The bones from the parts of the carcass which are characterized with bigger percentage of meat (chicken breast bone, thigh and drumstick) are being removed, and that meat is used for production of sausages with bigger quality, while other parts of the carcass are used for production of mechanically deboned meat (MDM), which is used for production of sausages with lower quality (Vasilev and Kitanovski, 2005).

### MATERIALS AND METHODS

Laying hens from the hybrid lines ISA brown and DeKalb which are excluded from

production due to end of the production cycle, 84 weeks old, were taken as material for examination.

Both of the hybrid lines are procured as day old chicks and they are bred in special object for floor system breeding. The chicks are bred on a mat from sawdust, with controlled feeding, according to recommendations from hybrid lines' producers.

During the breeding, the chicks get all the vaccines recommended from the Veterinary Institute.

The resettlement of pullets in the objects with cages is performed when they are 16 weeks old, in order to avoid stress.

Hens in production objects are fed with same food, which is being changed, depending on the age, water available all the time and in same ambient conditions. Because of high egg laying percentage and favourable market conditions, the exploitation period is extended and they are kept until 84 weeks old.

The examination of the slaughtering and the quantitative characteristics of laying hens were conducted in two parts. Examination of the slaughtering characteristics of hens was conducted in the first part, and examinations of the chemical composition of meat were conducted in the second part. Before slaughtering, the hens were subject to starving in period of 8 hours.

Thereby, the following measurements and activities were performed:

Weighing live weight of the hens, Slaughtering, Weighing bloody hen with head, calculating the amount of blood, Weighing the head, Weighing head, feathers, skin and legs up to the knee ankle, Calculating dressing percentage, Weighing internal organs, Weighing wings, Weighing drumstick and hip with bone, Weighing the meat from drumstick and hip without bone, Weighing white meat with bone, Weighing the back with the neck and all the tissues which belong to it.

The cutting of slaughtered hen's carcass on main pieces is made according to the principles and criteria for classification and categorization of meat, which are applied for cutting the hen carcasses.

The main parts of the carcass according to the general criteria for classification and categorization of meat is made according to generally accepted criteria for cutting chicken carcasses. The chicken meat is categorized in three quality categories, whereas chest and drumstick with hip belong to first category. The wings belong to second category, and the third category is comprised of back with pelvis.

The comparison of the data between two groups was held by using t- test ( $p < 0.05$ ).

## RESULTS AND DISCUSSIONS

After removal of inner organs, a pure carcass is obtained. The average weight of chicken carcasses from ISA Brown hybrid line is 870.40 g, and the average weight of chicken carcasses from DeKalb hybrid line it is 734.55 g. The difference in average weight of pure carcasses is 135.85 g in favour of ISA Brown, and it is statistically significant ( $p > 0.01$ ) (Tables 1 and 2).

The obtained weight of pure carcass is slaughter yield, which in our case is nearest to yield of processing of poultry carcasses intended for barbecue (grill processing). In our case, the yield is without skin, since it is removed along with subcutaneous fat tissue.

Yield of pure carcasses without inner organs and skin of chicken from ISA Brown hybrid line is 49.80%, while the yield of chicken from DeKalb hybrid line is 46.80%. The results for the slaughter yield that are obtained in our examinations, show significant differences in comparison to other authors. In the researches of Nikolova and Bogosavljević-Bošković (2011) for determination of quality of the broiler carcass from two hybrid lines slaughtered at different age, the yield was presented through three kinds of carcass processing: classic processing, „ready to roast” and „ready to grill”. The authors determined that the age factor has biggest impact on the yield in classic processing ( $p < 0.05$ ), as they were processed in our researches.

Similar results for slaughter yield were conducted by Zivkovic (1994) of broilers intended for barbecue from the hybrid line Hibro which is 63.3%.

Table 1. Slaughter yield of hens from ISA Brown hybrid line

	Carcasses without blood		Carcasses without head		Carcasses without skin		Clean carcasses	
	g	%	g	%	g	%	g	%
x	1695.35	97.00	1629.00	93.25	1276.55	73.04	870.40	49.89
min	1472.00		1416.00		1111.00		746.00	
max	1907.00		1830.00		1437.00		978.00	
Sd	123.65		120.58		106.87		57.72	
Cv	7.29		7.39		8.37		6.63	

Table 2. Slaughter yield of hens from DeKalb hybrid line

	Carcasses without blood		Carcasses without head		Carcasses without skin		Clean carcasses	
	g	%	g	%	g	%	g	%
x	1528.90	96.07	1457.45	91.15	1168.35	73.41	734.55	46.17
min	1225.00		1170.00		865.00		588.00	
max	1849.00		1764.00		1416.00		912.00	
Sd	175.17		166.93		157.06		85.79	
Cv	11.45		11.45		13.44		11.67	

Table 3. Share of basic parts in the weight of pure carcass of chicken from ISA Brown hybrid line

	Pure carcass	Wings		Thigh and drumstick		Chest		Back and neck	
		g	%	g	%	g	%	g	%
x	870.40	85.70	9.84	293.90	33.76	234.65	26.15	256.15	30.46
min	746.00	65.00		250.00		179.00		213.00	
max	978.00	99.00		327.00		268.00		305.00	
Sd	57.72	8.66		23.00		21.55		25.10	
Cv	6.63	10.11		7.82		9.18		9.80	

Table 4. Share of basic parts in the weight of pure carcass of chicken from DeKalb hybrid line

	Pure carcass	Wings		Thigh and drumstick		Chest		Back and neck	
		g	%	g	%	g	%	g	%
x	734.55	66.85	9.10	232.3	32.62	197.20	26.86	238.20	32.42
min	588.00	53.00		186.00		145.00		174.00	
max	912.00	80.00		287.00		254.00		309.00	
Sd	85.79	8.12		29.00		28.86		33.12	
Cv	11.67	12.15		12.48		14.63		13.90	

Once the weight of pure carcass is obtained, it is cut in basic parts, and the weight of the parts is measured. The results obtained from our examinations are given in Table 3 and Table 4. From Tables 3 and 4, it could be ascertained that the share of wings in the weight of pure carcass from ISA Brown hybrid line is 9.84%, i.e. 9.10% from DeKalb hybrid line. The difference in average weight of wings between the hybrid lines of laying hens is 18.85 g in favour of ISA Brown. Our obtained results for the average weight of wings of chicken from

both hybrid lines differ from those obtained by other researchers. Thus, according to examinations conducted by Ljubojević et al. (2011), it is determined that the share of wings in the total weight of the carcass from hybrid line Ross is 7.65% in male and 8.12% in female individuals.

The share of chicken thigh and drumstick in pure carcass is 33.76%, i.e. 31.62%. The differences in the average weight of thighs and drumsticks of the examined chicken are statistically significant ( $p < 0.05$ ).

In the carcasses of young chicken Rašeta and Dakić (1994) have determined that the share of the thigh and drumstick in the total weight of the carcass is from 29.8 % to 32.3 %, and they are in correlation with the results from our examinations. In their researches, Ljubojević et al. (2011), have stated that the share of the drumstick of male broilers from Ross hybrid line is 9.35 %, and the share of the thigh is 9.06%, while the share of the drumstick of female broilers is 9.10%, and the share of the thigh is 8.51%.

In the conducted examination about the impact of selenium and vitamin E in the nutrition of broilers from hybrid line Cobb 500, Marković et al. (2009) have ascertained that the share of thigh and drumstick in the total weight of carcass of slaughtered broilers is 28.74, which is similar to the one in our researches.

The stated difference in the average weight of the chest (white meat with bones) of chicken from ISA Brown and DeKalb hybrid lines is 37.45 in favour of ISA Brown at the level of ( $p < 0.01$ ).

The share of the back and neck in the weight of pure carcass of hens from ISA brown hybrid line is 29.42 %, i.e. 32.42% of laying hens from DeKalb hybrid line. The difference of average weight of the back and neck is in favour of ISA Brown, in both absolute and relative indicators, and it is statistically significant at the level of ( $p < 0.05$ )

Similar results are obtained in the researches of Pavlovski et al. (2009), Hopić et al. (2002), Blagojević et al. (2009).

## CONCLUSIONS

On the basis of conducted researches about slaughter and quantitative characteristics of

meat from laying hens from ISA Brown and DeKalb hybrid lines, it could be ascertained that the hybrid line and method of breeding, in direction of improvement of genetic characteristics of the hybrids, have impact on the slaughter yield, the quality, the nutritive and the biological value of poultry.

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