



PARAMETERS MEAT QUALITY OF BROILERS FROM DIFFERENT REARING SYSTEMS¹

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Addresses

Background

The share of certain tissues in major basic carcass parts is no doubt an important element determining broiler meat quality (*Karan-Djuric et al., 1977*).

The quality trait mentioned and also carcass quality are affected by a number of factors. Of the biological ones, the greatest effect was exerted by genotype, sex and age (*Preston et al., 1973, Antonijevic et al., 1982, Orr and Hund 1984 etc.*). Among numerous non-genetic factors that may considerably influence meat quality, the rearing systems, or broiler keeping systems have been particularly stressed by some authors over the past years (*Bogosavljevic-Boskovic et al., 1999, Pavlovski et al., 2001, Milosevic et al., 2003*). The authors also maintained that intensive industrial production in poultry farming results, among other things, in lower product quality, due to which there is an increasing number of advocates of non-industrial broiler rearing system among not only researchers and consumers but also among producers, particularly with the aim of producing better quality meat.

Objectives

The aim of this paper was to analyze the meat quality of the broilers reared in two different non-industrial ways of rearing (extensive rearing in a chicken pen and free-range rearing). The basic tissues shares in major broiler carcass parts serving as quality parameters were examined. The aim of the paper was a comparative analysis of the broiler meat quality trait mentioned in terms of the effect of the non-industrial rearing systems used.

Materials and methods

The initial experimental material consisted of 200 one-day-old chicks of the line hybrid Hybro G. The fattening of the broilers lasted 56 days. In the first four weeks the rearing was conducted within the same construction with the deep floor covering. Then, at 28 days, the experimental chicks were divided into two groups. One group was reared within a closed object, in a chicken pen, at population density of 12 broilers per square metre (under the extensive production conditions in the chicken pen) - according to the European Union regulations on non-industrial poultry meat production, mentioned by *Tolimir and Masic 2000, as well as by Ristic 2003*. The second group was provided with the same useful area within the closed construction, but there were outlets overgrown with grass for these chickens, too. The free-range area size was such to provide each chicken with 1 square metre of the area. The trial chickens were fed two appropriate complete feed mixtures: the initial one (up to 28th day) and the final one (from the 28th to the 49th day of fattening). In the last week of the fattening period, the chicks diet consisted of 70 % ground corn mixture and about 30 % of concentrate mixture.

Following the fattening period, with the aim of examining major meat quality characteristics, 12 broilers were chosen at random from each experimental group. The dressed and cooled carcasses were then dissected into basic parts (breasts, thighs, drumsticks, wings, pelvis and back). After the dissection, for the purpose of determining the yield and share of basic tissues (muscles, bones and skin) in major carcass parts, the breast and right thigh dissections were made.

The research data analysis was made by using the usual variation statistics methods. The testing of the significance of differences was conducted through the following mathematical variation analysis model:

$$Y_{ijk} = \mu + S_i + (SR)_{ij} + e_{ijk}$$

¹ Original scientific paper

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that is, the model corresponding to the two-factor experimental plan 2x2 (2 sexes -S and 2 systems of rearing -SR).

Results and discussion

Table 1 shows values of slaughter yields and shares of basic tissues in both hens and cocks reared in two different non-industrial rearing systems (I group – in the free-range rearing and the II one – in the extensive chicken-pen rearing system).

T1

From table 1 one can see a somewhat higher muscular tissue share in breast mass in both hens and cocks of the first experimental group (free-range rearing) compared to the broilers reared extensively, in the chicken-pen (II experimental group). A somewhat higher bone share was registered with the chick of the other trial group. Skin share in the breast mass ranged from 10.96 (males of the II trial group) to 13.53 % (females of the same group). However, from the point of view of both meat share and bone and skin share in breast mass, the emerged differences between both sexes and the rearing systems investigated were not significant.

The mentioned study results on the participation of basic tissues in broiler breasts are in between the results for free-range-reared chicks by *Bogosavljevic-Boskovic et al. (1999)* and *Milosevic et al. (2003)*.

Table 2 presents the yields and shares of basic tissues in drumstick mass of the males and females investigated.

T2

Based upon the table 2 data it could be concluded that a somewhat higher muscular tissue share in the drumstick mass was recorded in the I experimental group chicks. Furthermore, a somewhat higher participation of the muscular tissue in the basic carcass part mentioned was registered with the females in both rearing systems. However, the emerged differences were not statistically significant neither from the point of view of the sex influence, nor from the viewpoint of the effect of the rearing systems investigated. Further data in table 2 show that the bone share in the experimental broiler drumsticks ranged from 23.52 (females of the I experimental group) to 28.21 % (males of the I investigated group). The data also indicate that the lowest and highest skin shares in drumstick mass were registered with the males fattened extensively in the chicken-pen (9.30%) and with the free-range-reared males (10.89 %), respectively. However, the differences in terms of both the bone share and the skin share in the drumstick mass between the trial broilers were also not significant.

The established relative values of the occurrence of muscular tissue in drumstick mass were somewhat higher than the results of *Bogosavljevic-Boskovic et al. (1999)* and were in accordance with the results of *Milosevic et al. (2003)*.

Conclusions

Based upon the study results on the basic tissue shares in major carcass parts of broilers reared in two different non-industrial rearing systems (I group – rearing using free-range and II – extensive rearing in the chicken-pen), the following may be inferred:

- The free-range-reared broilers had a somewhat higher meat share in breast mass and drumstick mass compared to the ones reared extensively in the chicken-pen.
- A somewhat higher meat share in drumstick mass was recorded with the females than with the males, whereas the other differences in terms of the sex effect were also slight.
- The analysis of the significance of the emerged differences in terms of the effect of the rearing systems investigated and the sex of broilers on the share of certain tissues in major carcass parts has shown that the differences were not statistically significant.



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Table 1. Percentage of meat, skin and bone in breast(%)

Experimental group	Sex		Breast	Meat		Bone		Skin	
			g	g	%	g	%	g	%
I	Male	\bar{X}	818,98	615,20	75,09	99,58	12,32	99,44	12,01
		S _d	65,80	61,03	4,05	23,95	3,67	34,75	3,38
		C _v	8,03	9,92	5,39	24,05	29,79	34,94	28,14
	Female	\bar{X}	728,50	560,16	76,78	77,44	10,77	86,28	11,83
		S _d	71,99	67,48	2,97	10,63	1,85	22,54	2,75
		C _v	9,88	12,04	3,87	13,67	17,18	26,12	23,24
II	Male	\bar{X}	752,46	563,38	74,58	103,0	13,89	81,74	10,96
		S _d	100,82	99,46	3,72	23,49	3,61	7,32	1,23
		C _v	13,40	17,65	4,99	22,80	25,99	8,95	11,22
	Female	\bar{X}	695,52	506,16	72,67	89,90	12,99	94,06	13,53
		S _d	77,21	63,59	1,49	10,23	1,46	17,66	1,94
		C _v	11,10	12,56	2,05	11,38	11,24	18,77	14,34
Fexp	F ₁			2,52	2,58	0,90	2,23	0,23	0,08
	F ₂			2,83	0,01	4,54*	0,94	0,00	1,17
	F ₁₂			0,00	1,56	0,28	0,07	1,56	1,56



Table 2. Percentage of meat, skin and bone in drumstick(%)

Experimental group	Sex		Drumstick	Meat		Bone		Skin	
			g	g	%	g	%	g	%
I	Male	\bar{X}	189,38	119,56	63,14	46,84	24,80	20,76	10,89
		S _d	18,82	13,63	3,61	7,32	3,73	4,96	1,93
		C _v	9,94	11,40	5,72	15,63	15,04	23,89	17,72
	Female	\bar{X}	156,00	101,18	64,80	36,50	23,52	16,54	10,52
		S _d	10,02	8,75	2,39	4,09	3,46	4,23	2,16
		C _v	6,42	8,65	3,69	11,20	14,71	25,57	20,53
II	Male	\bar{X}	182,78	113,00	62,46	51,20	28,21	17,28	9,30
		S _d	26,84	18,47	3,84	6,58	3,56	5,32	1,66
		C _v	14,68	16,34	6,15	12,85	12,62	30,78	17,85
	Female	\bar{X}	156,02	100,46	64,28	37,52	24,04	16,74	10,68
		S _d	9,56	5,89	3,03	4,81	2,68	3,34	1,70
		C _v	6,13	5,86	4,71	12,82	11,15	19,95	15,92
Fexp	F ₁			0,42	0,17	1,06	1,70	0,66	0,74
	F ₂			7,49**	1,42	21,11**	3,25	1,38	0,36
	F ₁₂			0,27	0,01	0,41	0,91	0,83	1,09