

## RESEARCHES CONCERNING THE SLAUGHTERING EFFICIENCY AND THE CUT PARTS PROPORTION IN THE CARCASSES OF THE CHICKEN BROILERS REARED WITHIN INTENSIVE SYSTEM

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### Abstract

*The researches focused on some aspects concerning meat yield in chicken broilers reared within the intensive system. The biological material comprised 120 broilers, belonging to "COBB-500" (30♀ and 30♂) and "ROSS-308" (30♀ and 30♂), slaughtered at 42 days old. The slaughtering efficiency was calculated using the gravimetric data achieved at slaughter moment and at 24 hours post slaughter. Through the rationing between trenced parts weights and carcasses weight, the proportion of these commercial products in carcass structure was calculated. In "COBB-500" broilers, the average achieved values, for both genders, are listed below: 78.94% (fresh) and 77.76% (post refrigeration); participation of trenced parts in whole carcass: 29.66% (breast with bone and skin), 8.98% (wings), 15.71% (thighs), 13.33% (shanks) and 32.33% (carcass remnants). At the ROSS-308 chickens (males and females), there have been calculated the average values listed below: 79.56% (fresh carcasses) and 78.40% (refrigerated carcasses); participation of trenced parts in carcass: 29.20% (breast with skin and bone), 9.11% (wings); 16.31% (thighs); 13.32% (shanks) and 31.4% (carcass remnants). For both studied genotypes, the slaughtering efficiency was found within the range specified by the hybrids producers (77-80%) while the breast participation in carcass structure reached very good values.*

**Key words:** chicken broiler, intensive system, carcass, slaughtering efficiency, trenced parts

### INTRODUCTION

The companies producing high performances broilers provide to poultry industry certain technical data describing hybrid performance, nutritional requirements and management parameters. However, these hybrids performances are straight related to the technological conditions provided by farmers and the technological specifications give a wide range of variation for meat yield parameters [7, 8]. Therefore, the paper emphasises on the results achieved during the intensive husbandry of two meat-type hybrids of chicken – COBB-500 and ROSS-308, mainly on those performances concerning dressed weight, slaughtering efficiency and proportion of the main cut parts in whole carcass structure.

### MATERIAL AND METHOD

Biological material was represented by 60 "Cobb 500" hybrid specimens (30♂ + 30♀) and by 60 "ROSS-308" hybrid individuals (30♂ + 30♀), aged 42 days,

selected as representative for the originating flock. Fowl feeding has been done using a corn-soymeal diet (3012 KCal ME and 24% CP - starter; 3175 KCal ME and 22.5% CP - grower; 3226KCal ME and 20% CP - finisher). Necropsy has been used to eviscerate and cut the carcasses, according to the main anatomic and commercial parts nomenclature [2]. From each chicken, live weight, carcass (fresh and refrigerated, completely eviscerated) and main trenced parts have been weighted. Gravimetric assessments have been run using a Shimadzu UX4200H technical digital scales (0.01 g – 4200 g range) and a Denver Instruments Pinnacle 214 analytical digital scales (0.1 mg – 210 g range). The slaughtering efficiency has been calculated, dividing carcass weight values to the live weight ones and multiplying by 100. Same computation algorithm has been used to obtain the participation quota of the trenced parts. The data was compared to the hybrids performances, as they were published by

broilers producers, and to those date found in the main scientific stream [3, 4, 7, 8]. The achieved values of the studied parameters have been statistically processed running the ANOVA single factor method.

## RESULTS AND DISCUSSIONS

In “COBB-500” broilers, the fresh carcasses weight varied between

1705.0±33.4g (females) and 1818.57±38.17g (males), leading to an average value of 1761.79±29.02g for both genders (table 1). The variation coefficient indicated a very well uniformity (V=6.2%). After variance analysis computation, statistical significance occurred for the differences between cockerels and pullets.

Table 1  
 Slaughtering efficiency and the participation of the trenched parts in the whole carcass structure of “COBB-500” broilers

Notice	Males			Females			Average values for both genders		
	$\bar{X} \pm$	$S_{\bar{x}}$	V (%)	$\bar{X} \pm$	$S_{\bar{x}}$	V (%)	$\bar{X} \pm$	$S_{\bar{x}}$	V (%)
Live weight (g)	2295.71	50.1	5.8	2168.57	43.8	5.3	2232.14	36.50	6.1
Fresh carcass weight (g)	1818.57 <sup>b</sup>	38.17	5.6	1705.00 <sup>a</sup>	33.42	5.2	1761.79	29.02	6.2
Slaughtering efficiency on fresh carcass(%)	79.23	0.38	1.3	78.64	0.60	2.0	78.94	0.35	1.7
Refrigerated carcass weight (g)	1794.62 <sup>b</sup>	37.82	5.6	1676.68 <sup>a</sup>	33.40	5.3	1735.65	29.24	6.3
Slaughtering efficiency on refrigerated carcass(%)	78.19	0.43	1.5	77.33	0.52	1.8	77.76	0.35	1.7
Breast with bone+skin weight (g)	534.59 <sup>b</sup>	11.11	5.5	495.01 <sup>a</sup>	11.03	5.9	514.80	9.31	6.8
% from carcass	29.79	0.16	1.4	29.52	0.21	1.9	29.66	0.13	1.7
Breast fillet weight (g)	402.64 <sup>b</sup>	9.08	6.0	372.32 <sup>a</sup>	8.26	5.9	387.48	7.24	6.9
% from carcass	22.43	0.04	0.4	22.20	0.12	1.5	22.32	0.07	1.2
Wings weight (g)	164.89 <sup>b</sup>	4.60	7.4	147.02 <sup>a</sup>	3.53	6.4	155.96	3.73	8.9
% from carcass	9.18 <sup>b</sup>	0.08	2.3	8.77 <sup>a</sup>	0.13	4.1	8.98	0.09	3.9
Thighs weight (g)	275.05	8.91	8.6	270.16	7.15	7.0	272.60	5.53	7.6
% from carcass	15.32	0.35	6.1	16.10	0.11	1.8	15.71	0.21	4.9
Shanks weight (g)	237.17	6.81	7.6	225.95	7.71	9.0	231.56	5.18	8.4
% from carcass	13.20	0.12	2.5	13.45	0.22	4.3	13.33	0.13	3.5
Remnants weight (g)	582.91 <sup>c</sup>	11.25	5.1	538.53 <sup>a</sup>	7.33	3.6	560.72	8.91	5.6
% from carcass	32.50	0.37	3.0	32.16	0.41	3.4	32.33	0.27	3.1

ANOVA test – for each analysed feature, compared between genders:

<sup>ab</sup> significant differences ( $\hat{F} > F \alpha 0.05$  la 1;58 FD);

<sup>ac</sup> distinguished significant differences ( $\hat{F} > F \alpha 0.01$  la 1;58 FD).

The situation was similar after refrigeration. Using algebraic computation, the slaughtering efficiency has been calculated for both assessment moments. Therefore, an average value of 78.94±0.35% was obtained for both genders, when the calculation has been done basing on the data measured just after slaughtering, while the

post-refrigeration values were slightly lower, meaning 77.76±0.35% (table 1, fig. 1) for males and females together. The achieved values were higher than those specified by the “COBB-500” hybrid producer company, which guarantees the reaching of at least 72% slaughtering efficiency for the completely eviscerated carcasses [6, 7].

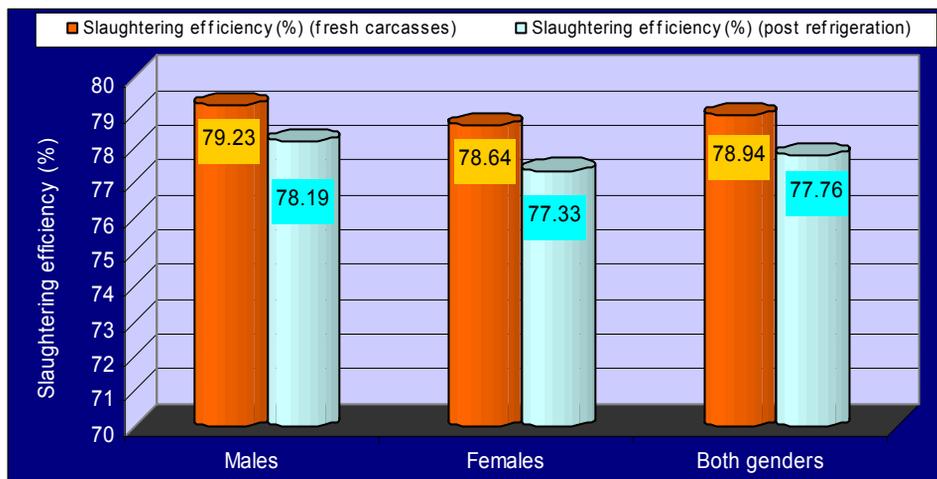


Fig. 1 – Slaughtering efficiency values in “COBB-500” broilers

Concerning the participation of main trenched parts in carcass formation, the data showed proportions of  $29.79 \pm 0.16\%$  (males) and of  $29.52 \pm 0.21\%$  (females), for breast, including bone and skin, while the homogeneity was found very good ( $V=1.7\%$ ). When breast fillet (sum of superficial and profound pectoral muscles) participation was calculated, it was found a mean value of  $22.32 \pm 0.07\%$  (both genders), very close to that published in 2008 by Cobb Vantress UK ltd. Into the technical specification files of the hybrid ( $22.36\%$ ) [7]. Despite this, an improvement may occur, considering that “COBB-500” producer states that this production parameter could increase each 2 years with 0.9 p.p., using genetic improvement ways [5].

The others carcasses components reached mean participation quotas of  $8.98 \pm 0.09\%$  (wings); of  $15.71 \pm 0.21\%$  (thighs);  $13.33 \pm 0.13\%$  (shanks);  $32.33 \pm 0.27\%$  (other parts, meaning head, neck, back and legs). Comparing both genders, it could be stated that, for breast involvement in carcass formation, cockerels gave higher results, while the values for both rear limbs parts (thighs and shanks) were found better in pullets (table 1).

If the performances of cockerels are compared to those achieved by pullets, it could be observed that, for breast fillet participation in whole carcass, males gave better results, while the data concerning thighs and shanks participation were higher Table 2

in females (table 1). Statistical significance occurred for the differences between genders.

In “Ross 308” broilers, the fresh carcasses weight was found within the interval of  $1749.63 \pm 31.65\text{g}$  (females) and  $2056.39 \pm 24.00\text{g}$  (males), with an average of  $1903.01 \pm 41.89\text{g}$  for genders considered together (table 2). The variation coefficient also revealed very well uniformity of the studied flock ( $V=3.6-5.43\%$ ). Highly significant statistical differences occurred between the averages of cockerels and pullets, when the variance has been analysed.

After refrigeration, the weight difference between males and females was preserved. The slaughtering efficiency was calculated, resulting average values of  $79.52 \pm 0.30\%$ , for both genders fresh carcasses, respectively of  $78.36 \pm 0.30\%$ , post refrigeration (table 2, fig. 2).

The achieved values corresponded to the highest edge of the interval specified by the “ROSS-308” producers, whose limits are of 70-81% - slaughtering efficiency, assessed on completely eviscerated carcasses [8].

Concerning the main trenched parts participation in whole carcass structure, several values occurred: breast with bone and skin reached  $29.32 \pm 0.81\%$  in males and  $29.07 \pm 0.29\%$  in females, the average value for both genders being of  $29.20 \pm 0.42\%$ , while the uniformity was considered as very well ( $V=1.63\%$ ). Other scientific articles presented values passing over 30% for this carcass cut part [3].

Slaughtering efficiency and the participation of the trenched parts in the whole carcass structure of "ROSS-308" broilers

Notice	Males			Females			Average values for both genders		
	$\bar{X} \pm$	$S_{\bar{x}}$	V (%)	$\bar{X} \pm$	$S_{\bar{x}}$	V (%)	$\bar{X} \pm$	$S_{\bar{x}}$	V (%)
Live weight (g)	2563.52 <sup>d</sup>	29.96	3.51	2220.52 <sup>a</sup>	43.62	5.89	2392.02	48.88	8.67
Fresh carcass weight (g)	2056.39 <sup>d</sup>	24.00	3.50	1749.63 <sup>a</sup>	31.65	5.43	1903.01	41.89	9.34
Slaughtering efficiency on fresh carcass(%)	80.22 <sup>b</sup>	0.32	1.20	78.82 <sup>a</sup>	0.40	1.51	79.52	0.30	1.60
Refrigerated carcass weight (g)	2027.94 <sup>d</sup>	24.35	3.60	1722.70 <sup>a</sup>	31.37	5.46	1875.32	41.73	9.44
Slaughtering efficiency on refrigerated carcass(%)	79.11 <sup>c</sup>	0.32	1.21	77.61 <sup>a</sup>	0.38	1.46	78.36	0.30	1.63
Breast with bone+skin weight (g)	594.61 <sup>d</sup>	17.55	8.85	504.65 <sup>a</sup>	8.19	4.87	547.56	14.77	11.45
% from carcass	29.32	0.81	8.26	29.07	0.29	2.99	29.20	0.42	6.06
Breast fillet weight (g)	492.44 <sup>d</sup>	14.82	9.03	377.85 <sup>a</sup>	11.97	9.51	435.15	16.69	16.27
% from carcass	24.27 <sup>c</sup>	0.62	7.68	21.91 <sup>a</sup>	0.45	6.12	23.09	0.47	8.62
Wings weight (g)	194.15 <sup>d</sup>	7.34	11.35	149.59 <sup>a</sup>	5.83	11.69	171.87	7.06	17.43
% from carcass	9.56 <sup>b</sup>	0.29	9.02	8.67 <sup>a</sup>	0.22	7.50	9.11	0.21	9.56
Thighs weight (g)	319.55 <sup>b</sup>	7.42	6.97	290.75 <sup>a</sup>	8.11	8.37	305.15	6.37	8.86
% from carcass	15.75 <sup>a</sup>	0.27	5.19	16.87 <sup>b</sup>	0.33	5.93	16.31	0.25	6.48
Shanks weight (g)	266.98 <sup>b</sup>	5.73	6.44	238.89 <sup>a</sup>	5.87	7.37	252.94	5.24	8.79
% from carcass	13.17	0.26	5.87	13.90	0.43	9.33	13.32	0.05	15.90
Remnants weight (g)	652.65 <sup>b</sup>	13.58	6.24	542.95 <sup>a</sup>	15.98	8.83	597.80	16.75	11.89
% from carcass	32.20	0.68	6.30	31.48	0.52	4.98	31.84	0.42	5.64

ANOVA test – for each analysed feature, compared between genders:

<sup>ab</sup> significant differences ( $\hat{F} > F \alpha 0.05$  la 1;58 FD);

<sup>ac</sup> distinguished significant differences ( $\hat{F} > F \alpha 0.01$  la 1;58 FD).

<sup>ac</sup> high significant differences ( $\hat{F} > F \alpha 0.01$  la 1;58 FD).

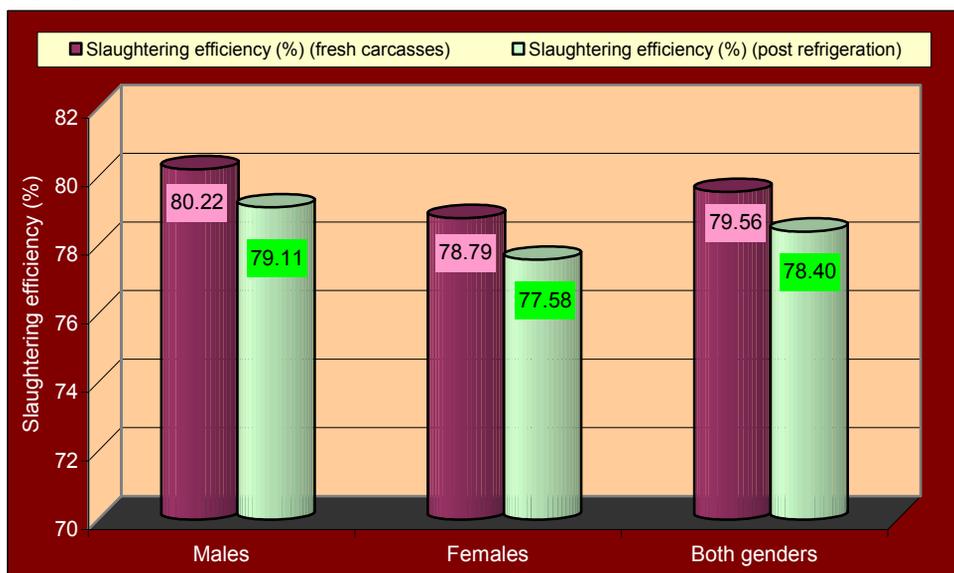


Fig. 2 – Slaughtering efficiency values in "ROSS-308" broilers

Breast fillet (sum of the superficial and profound pectorals muscles) participation in carcass structure reached an average value of  $23.09 \pm 0.07\%$ , considered as very well, compared to the minimal performance guaranteed by the "ROSS-308" technical specifications (19-20%). High significance occurred for the difference between both genders.

The other carcass parts reached average participation percentages of  $9.11 \pm 0.21\%$  (wings);  $16.31 \pm 0.25\%$  (thighs);  $13.32 \pm 0.05\%$  (shanks);  $31.84 \pm 0.84\%$  (remnant parts, comprising head, neck, back and legs). Close results have been also reported by similar researches, but in other hybrids, such as Hybro and Arbor Acres [1].

## CONCLUSIONS

It was found that, within the same genotype, the males produced highest breast fillet yields, while the females gave better weights for thighs and shanks.

The performances of both hybrids were situated within the producers' specifications, even toward the upper area of the variation interval.

Meanwhile, within the same nutritional conditions, "ROSS-308" broilers provided better slaughtering efficiency than the "COBB-500" ones, including the breast fillet yield ( $\approx +3\%$ ). Despite this, the

differences between studied broilers were not statistically tested, due to some different microclimate control conditions recorded during rearing.

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