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STUDY ABOUT CHICKEN CARCASS PROTEIN CONTENT

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Abstract

Meat quality and control of meat quality in poultry production are requiring a good management through whole production chain aiming both performances improvement with the raise of profitability and production of products at required quality standard.
This study was performed with the aim to observe a poultry meat quality index compulsory inside the European Union because of the free food products trade inside the Union.
Experiments were performed inside Avicola Crevedia during two years and with two industrial chicken hybrids (ROSS 308 and COBB 500) with the aim of finding the influence of both hybrid and production season on total chicken meat protein content.
During firs year of experiment total protein content of ROSS 308 hybrids had values between 17.4272 g (season 1) and 17.4688 g (season 2) with difference non-significant statistically. COBB 500 hybrids had total chicken meat protein content between 18.3196 g and 18.3960 g (NS). Differences between average values of the two tested hybrids were highly significant statistically both in first and second season (respectively $t=4.9332^{***}$ and $t=5.2795^{***}$).
Results were similar during the second year of the experiment with carcass protein content values between 17.4472 g and 17.4032 g in ROSS 308 hybrids and between 18.5392 g and between 18.6212 g in COB 500 hybrids (NS). Like in the previous year, differences between the two hybrids for the analyzed parameter were highly significant statistically which allows us to affirm the superiority of COBB 500 hybrid.

Key words: *protein, carcasses, broiler.*

INTRODUCTION

Quality is paramount in promoting the product „hen broiler meat" (currently known as „broiler meat") on the market.
As nowadays concurrence is fierce in any business quality is both the main assurance factor of business sustainability and the main management tool used by the enterprises.
Poultry meat quality might be evaluated base on several criteria: anatomical-histological, zoo-technical, economical, commercial, shelf life and fitness for human consumption (Georgescu, and col., 2000).
Many authors have described meat quality as a combination of objective and measurable characters (features, indices and criteria) generally classifiable in four components: flavors, nutritional characters, technological characters and hygienic characters.

MATERIALS AND METHODS

Study was performing in a poultry production farm (Avicola Crevedia) during two years, using two genetic types of industrial broiler hybrids (industrial hybrids ROSS 308 and COBB 500).
Influence of genetic types and season on carcass protein content was evaluated.
Groups of 100 birds (50-50) were formed and raised in uniform conditions and in extended captivity, in upgraded houses, by sticking to standard technologies of both hybrids; feeding and watering were performed „ad libitum" and slaughtering was performed at 42 days of age.
Experimental groups were raised in two seasons (season 1 – warm: April-September; season 2 – cold: October-March), and the experimental schedule was repeated next year.
Poultry were feed with combined feeds processed according to nutritional requirements

of studied hybrids by three research phases: starter 1-10 days, production 11-25 days and finishing 26-42 days (table 1).

Table 1. Mixed feed used in experiment

SPECIFICATION	STARTER (1-10 DAYS)	PRODUCTION (11-25 DAYS)	FINISHING (26-42 DAYS)
TOTAL	100.00	100.00	100.00
ME, KCAL/KG	3055	3178	3228
CP%	24.00	22.00	20.00
CF%	5.82	7.66	7.89
CE%	3.63	3.75	3.90
CA%	1.00	0.90	0.85
AVAILABLE P %	0.50	0.45	0.42
NA%	0.16	0.16	0.16
CL%	0.22	0.22	0.22
LYSINE%	1.44	1.25	1.05
DIGESTIBLE LYSINE POULTRY%	1.32	1.13	0.94
METHIONINE%	0.96	0.85	0.71
DIGESTIBLE METHIONINE POULTRY %	0.93	0.83	0.69
METHIONINE+CYSTINE%	1.36	1.22	1.04
METHIONINE + CYSTINE POULTRY %	1.27	1.13	0.96
TREONINE%	0.93	0.82	0.75
TRIPTOPHAN%	0.26	0.25	0.23

The combined feeds contained several types of raw materials: cereals, vegetal and animal protein, minerals, premixes and synthesis feeds. Total carcass protein content was evaluated after slaughtering by using the total carcass nitrogen content by multiplying this with a factor of 6.25 and the statistical significance of noticed differences between averages of the two genetic types and also between the two seasons of each year was tested.

RESULTS AND DISCUSSIONS

Carcass protein content is an important quality sign because physiologically linked water is closely related with it. Analyze was performed based on carcass nitrogen content by multiplying this with a factor of 6.25 according to methodology described in chapter about working material and method.

We are going to show average value of feature analyzed for the two studied groups and the statistical significance of differences noticed between averages to emphasize a likely influence of genetic type carcass protein content as other possible influence factor were as much as possible eliminated especially by leveling the environment conditions and procedures of group designing.

In table 2 and figure 1 we are showing values found for "carcass protein content" of the two groups used in experiment in year I and seasons 1 and 2.

COBB 500 hybrids are having the best average value of feature analyzed in year I and season 1 – 4.87% higher than average value of ROSS 308 hybrids. Testing significance of noticed differences between averages of the two experimental groups showed estimated values of Student test higher than table values ($t = 4.9332^{***}$) which are illustrating that there are some highly statistically significant differences between them.

This proves the superiority of COBB 500 hybrids in this matter and differences noticed are related to genetic type as consequence of conditions in which experiment was performed.

Table 2. Influence of genetic type on carcass protein content, first year, first and second season

Genetic type	n	$\bar{X} \pm s_{\bar{x}}$	s	c.v.%
First year, first seson				
ROSS 308	25	17.4272 ± 0.1477	0.7384	4.2372
COBB 500	25	18.3196 ± 0.1045	0.5223	2.8510
Differences significance	$t = 4.9332^{***}$ $t_{48;0.05} = 2.01$; $t_{48;0.01} = 2.68$; $t_{48;0.001} = 3.51$			
First year, second seson				
ROSS 308	25	17.4688 ± 0.1532	0.7662	4.3863
COBB 500	25	18.3960 ± 0.0858	0.4289	2.3316
Differences significance	$t = 5.2795^{***}$ $t_{48;0.05} = 2.01$; $t_{48;0.01} = 2.68$; $t_{48;0.001} = 3.51$			

Hierarchy about average value of carcass protein content has been the same in year I and season 2 and best average performance has been noticed in COBB 500 hybrids with 5.04% higher than value noticed in chickens ROSS 308. Average performances for carcass protein content are actually the same in the two analyzed seasons. Noticed differences between averages of carcass protein content in carcasses from the two genetic types are highly significant statistically according to Student test ($t = 5.2795^{***}$) and so we are able to sustain further the superiority of COBB 500 hybrid at

least in house we analyzed and in the environmental conditions in which the experiment was performed.

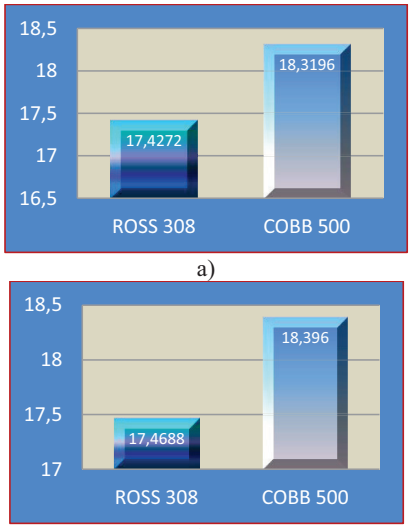

Figure 1. Average carcass protein content (g) at both hybrids, first year, first season (a) and second season (b)

In table 3 and figure 2 we are showing values found for "carcass protein content" of the two groups used in experiment in year II and seasons 1 and 2.

In year II and season 1 birds of group COBB 500 have showing the best average value of carcass protein content with 5.89% higher than value noticed in birds of ROSS 308 hybrid. Testing significance of noticed differences between averages of the two experimental groups showed estimated values of Student test higher than table values ($t = 6.6759^{***}$) which are illustrating that there are some highly statistically significant differences between them and so there is a superiority of COBB 500 hybrids.

Hierarchy is not changing in the second season and best average performance has been noticed in birds of COBB 500 hybrid (18.6212 ± 0.0836 percentage) which is a value 6.54% higher than in chickens ROSS 308 (17.4032 ± 0.1261 percentage). Noticed differences between averages of carcass protein content in carcasses from the two genetic types are highly significant statistically according to Student test ($t = 8.0522^{***}$) and so we are able to sustain further the superiority of COBB 500 hybrid in year II at least in house we analyzed and in the environmental conditions in which the experiment was performed.

Table 3. Influence of genetic type on carcass protein content, second year, first and second season

Genetic type	n	$\bar{X} \pm s_{\bar{x}}$	s	c.v.%
Second year, first seson				
ROSS 308	25	17.4472 ± 0.1345	0.6727	3.8555
COBB 500	25	18,5392 ± 0,0930	0.4652	2.5093
Differences significance	$t = 6.6759^{***}$ $t_{48;0,05} = 2.01$; $t_{48;0,01} = 2.68$; $t_{48;0.001} = 3.51$			
Second year, second seson				
ROSS 308	25	17.4032 ± 0.1261	0.6304	3.6224
COBB 500	25	18.6212 ± 0.0836	0.4178	2.2439
Differences significance	$t = 8.0522^{***}$ $t_{48;0,05} = 2.01$; $t_{48;0,01} = 2.68$; $t_{48;0,001} = 3.51$			

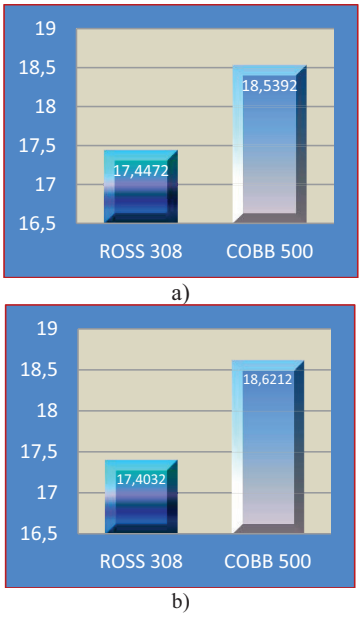

Figure 2. Average carcass protein content (g) at hybrids, second year, first (a) and second (b) season

The measure in which analyzed quality indexes are the same in year II in production house in which we performed the study is statistically analyzed by testing the significance of noticed differences between feature averages by year and season.

In tables 4 and 5 we are showing values found for Student test and their statistical significance.

Table 4. Testing of differences significance between years, first and second season, ROSS hybrid

Specification	Student value	Student critical value
First season ROSS		
Carcass weight	0.1020^{NS}	$t_{48;0,05} = 2,01$ $t_{48;0,01} = 2,68$ $t_{48;0,001} = 3,51$
Carcass protein content (b%)	0.1001^{NS}	
Second season ROSS		
Carcass weight	2.0699^{*}	$t_{48;0,05} = 2,01$ $t_{48;0,01} = 2,68$ $t_{48;0,001} = 3,51$
Carcass protein content (b%)	0.3306^{NS}	

Table 5. Testing of differences significance between years, first and second season, COBB hybrid

Specification	Student value	Student critical value
First season COBB		
Carcass weight	0.8660^{NS}	$t_{48;0,05} = 2,01$ $t_{48;0,01} = 2,68$ $t_{48;0,001} = 3,51$
Carcass protein content (b%)	1.5698^{NS}	
Second season COBB		
Carcass weight	0.0688^{NS}	$t_{48;0,05} = 2,01$ $t_{48;0,01} = 2,68$ $t_{48;0,001} = 3,51$
Carcass protein content (b%)	1.8804^{NS}	

Analyze of results is revealing that there are no statistical significant differences between averages of chickens of ROSS 308 hybrid between the two analyzed years excepting carcass weight in season 2. So it is recognized that there were no differences about the technologies of production, feeding and assurance of quality standard between previous and next year inside the house in which study was performed. The significant differences about carcass weight in season 2 might attributable to some trial errors.

Concerning results obtained for COBB hybrid (table 5) it is noticed that differences found between averages of the two analyzed years are not statistically significant.

CONCLUSIONS

Average carcass protein content had different values for the two analyzed hybrids. Value found in season I and year I has been 17.4272 ± 0.1477 percent in ROSS 308 and 18.3196 ± 0.1045 percent in COBB 500 and differences noticed between the two hybrids are highly significant statistically. Value found in season 2 has been 17.4688 ± 0.1532 percent in ROSS 308 and 18.3960 ± 0.0858 percent in COBB 500 and differences are highly significant statistically.

In year II and season 1 it was found a value of 17.4472 ± 0.1345 percent in ROSS 308 and 18.5392 ± 0.0930 percent in COBB 500 and differences noticed between the two hybrids are highly significant statistically. In season 2 it was found a value of 17.4032 ± 0.1261 percent in ROSS 308 and 18.6212 ± 0,0836 percent in COBB 500 and differences have been very significant from a statistical point of view.

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