Scientific Papers. Series D. Animal Science. Vol. LVIII, 2015
ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750

RESEARCHES ABOUT TOTAL CHICKEN PROTEIN CONTENT

Ioan CUSTURA[1], Minodora TUDORACHE[1], Ilie VAN[1], Maria Antoaneta POPA[2]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67, Email: johncustura2000@yahoo.com
[2]APIA Covasna, Sfântu Gheorghe, Str. Lt. Păiş David, no. 7, cod 520077.
Phone/Fax 0267-311.075 0267-311.148 0267-312.255, E-mail: apia.covasna@apia.org.ro.

Corresponding author email: johncustura2000@yahoo.com

Abstract

Poultry meat earned a very important position on worldwide animal food market due to both its nutritive value low costs compared with other animal protein sources. Poultry meat quality is a particularly complex feature and it is increasingly tackled by taking into consideration consumers' safety which is being now a disqualifying concurrence element on this market.
Considering this situation this study was performed with the aim of finding total chicken meat protein content.
Two chicken hybrids (ROSS 308 and COBB 500) were used during the experiment and influence of hybrid and production season on total chicken meat protein content was observed.
During firs year of experiment total protein content of ROSS 308 hybrids had values between 262.5669 g (season 1) and 265.4952 g (season 2) with difference non-significant statistically. COBB hybrids had a total chicken meat protein content between 312.4330 g and 316.6311 g (NS). Differences between average values of the two tested hybrids were highly significant statistically both in first and second season (respectively $t=12.2578^{***}$ and $t=12.3030^{***}$).
During the second year of the experiment carcass protein content values were between 263.1595 g and 257.9397 g in ROSS 308 hybrid and between 317.4594 g and 320.6270 g in COB 500 hybrid (NS). 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: *chicken, protein, broiler.*

INTRODUCTION

Poultry meat quality research concerning poultry meat water content is being a very sensitive issue inside the European Union. What is important is finding not just water content but also protein content and proportion water/protein. Last value is offering information about chicken groups which might be approved or rejected. Methods and requirements have been established by Directive EC no. 543/2008.
Allowed water content of broiler meat inside the European Union is being, depending of chilling method, up to 7% in poultry carcasses and between 2% and 6% in cut parts. Beyond these limits selling of the product is still permitted but under obligation to label it with red capital letters as "water content beyond EC limit".

MATERIALS AND METHODS

A study to find out total broiler protein content using two genetic types of industrial broiler hybrids, ROSS 308 and COBB 500, was perform in poultry production farm Avicola Crevedia.
ROSS 308 is a valuable hybrid with production result up to 2,8 kg average body weight al 47 days of age with sexes housed together and with a conversion index of 1.813 and with a good slaughtering output and also with a better contribution of main cut parts in carcass.
COBB 500 is a hybrid adapted for different climates and production systems. If broilers are raised non sexed body weight might be 2.6 kg at 42 days of age and with a conversion index of 1.76 and with an excellent livability. High quality carcasses are produced following slaughtering, with a high slaughtering output of 78-80%.

The study aimed to find out the influence of genetic type and season on carcass total protein content.

Experiments took place during two years with two sequences in each year (one sequence was raised during the warm season (season 1: April-September) and the second during the cold season (season 2: October-March).

Groups of 100 birds (50-50) were raised in uniform conditions and in extended captivity, in upgraded houses, by sticking to standard technologies of each hybrid; feeding and watering were performed „ad libitum" and slaughtering was performed at 6 weeks of age.

Combined feeds for birds were processed according to nutritional requirements of studied hybrids by three research phases: starter 1-10 days (3055 kcal ME/kg and 24% CP), production 11-25 days (3178 kcal ME/kg and 22% CP) and finishing 26-42 days (3228 kcal ME/kg and 20% CP).

Total carcass protein content was evaluated and detected differences between the two genetic types and also between the two seasons of each year was statistically tested after slaughtering.

RESULTS AND DISCUSSIONS

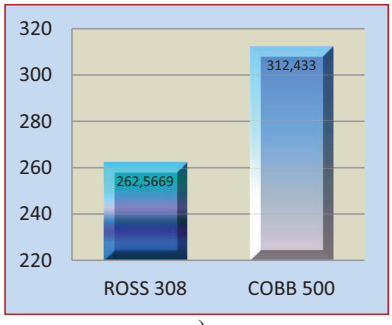
Chicken total protein content was evaluated in this paper as it is used for calculating chicken maximum acceptable water content. We are going to illustrate average values of this feature for the two discussed groups and also the statistical significance of differenced noticed between averages to evaluate quality standards in the house in which study was performed and also to emphasize a likely difference between the analyzed genetic types.

In table 1 we are illustrating value found for "chicken total protein content" in the two groups used in the experiment in year I and season 1.

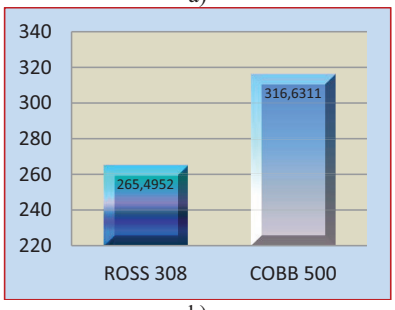
From analyze of data in table 1 and figure 1a) it is noticed that best average performance was found for carcasses from COBB 500 chickens with 15.96% higher than at ROSS 308 chickens. Significance of differences noticed between averages of this feature was tested using the Student test. So, calculated value of Student test ($t = 12.2578^{***}$) has been showing very significant differences between average performances presented by groups of the two genetic types.

Table 1. Influence of genetic type on total 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	262.5669 ± 3.6322	18.1612	6.9168
COBB 500	25	312.4330 ± 1.8320	9.1600	2.9318
Differences significance	$t = 12.2578^{***}$ $t_{48;0.05} = 2.01$; $t_{48;0.01} = 2.68$; $t_{48;0.001} = 3.51$			
First year, second seson				
ROSS 308	25	265.4952 ± 3.7698	18.8488	7.0995
COBB 500	25	316.6311 ± 1.7505	8.7525	2.7643
Differences significance	$t = 12.3030^{***}$ $t_{48;0.05} = 2.01$; $t_{48;0.01} = 2.68$; $t_{48;0.001} = 3.51$			



a)



b)

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

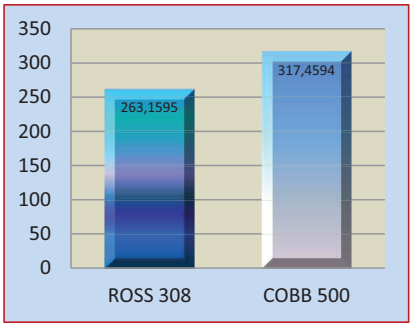
Hierarchy has been the same in year I and season 2 and best average performance has been noticed in chickens of hybrid COBB 500 with 16.16% higher than average performance noticed in chickens ROSS 308 in the environment inside the house in which study was performed. Estimated value of Student test was higher than table value for corresponding

tolerance limits and significance level was 0.001 which is demonstrating that there are very significant differences between analyzed averages ($t = 12.3030^{***}$).
In table 2 and figure 2 we are illustrating value found for "chicken total protein content" in the two groups used in the experiment in year II and seasons 1 and 2.

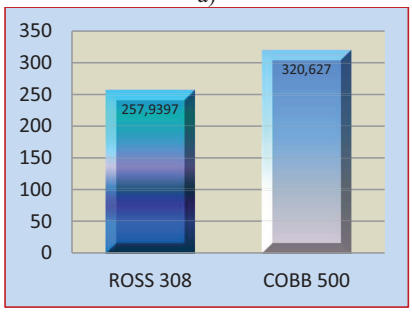
Table 2. Influence of genetic type on total protein content, second year, first and second season

Genetic type	n	$\bar{X} \pm s_{\bar{X}}$	s	c.v.%
Second year, first seson				
ROSS 308	25	263.1595 ± 2.9769	14.8843	5.6560
COBB 500	25	317.4594 ± 2.2162	11.0811	3.4905
Differences significance	$t = 14.6312^{***}$ $t_{48;0.05} = 2.01$; $t_{48;0.01} = 2.68$; $t_{48;0.001} = 3.51$			
Second year, second seson				
ROSS 308	25	257.9397 ± 2.5732	12.8660	4.9880
COBB 500	25	320.6270 ± 1.7459	8.7294	2.7226
Differences significance	$t = 20.1595^{***}$ $t_{48;0.05} = 2.01$; $t_{48;0.01} = 2.68$; $t_{48;0.001} = 3.51$			

It is noticed that in second year best average performance was also noticed in carcasses from chickens COBB 500 with 17.10% higher than average performance noticed in chickens ROSS 308. Measured value of Student test ($t = 14.6312^{***}$) is suggesting that there are very significant differences between average performances noticed for the groups containing the two genetic types.
Hierarchy has been the same in season 2 and best average performance has been noticed in chickens of hybrid COBB 500 with 19.55% higher than average performance noticed in chickens ROSS 308 in the environment inside the house in which study was performed. Estimated value of Student test ($t = 20.1595^{***}$) was higher than table value which is demonstrating that there are very significant differences between analyzed averages.
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.



a)



b)

Figure 2. Total protein content at both hybrids, second year, first season (a) and second (b) season

In tables 3 and 4 we are showing values found for Student test and their statistical significance.

Table 3. 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}	$t_{48;0.05} = 2,01$ $t_{48;0.01} = 2,68$ $t_{48;0.001} = 3,51$
Total protein content of chicken (RP)	0.1262^{NS}	
Second season ROSS		
Carcass weight	2.0699^{*}	$t_{48;0.05} = 2,01$ $t_{48;0.01} = 2,68$ $t_{48;0.001} = 3.51$
Total protein content of chicken (RP)	1.6553^{NS}	

Table 4. 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}	$t_{48;0,05} = 2.01$ $t_{48;0,01} = 2.68$ $t_{48;0,001} = 3.51$
Total protein content of chicken (RP)	$1,7481^{NS}$	
Second season COBB		
Carcass weight	0.0688^{NS}	$t_{48;0,05} = 2.01$ $t_{48;0,01} = 2.68$ $t_{48;0,001} = 3.51$
Total protein content of chicken (RP)	$1,6163^{NS}$	

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.

For COBB 500 hybrid noticed differences between averages between the two analyzed years are not statistically significant.

CONCLUSIONS

Average protein content had different values for the two analyzed hybrids. Value found in season I and year I has been 262.5669 ± 3.6322 grams in ROSS 308 and 312.4330 ± 1.8320 grams in COBB 500 and differences noticed between the two hybrids are also highly significant statistically. Value found in season 2 has been 265.4952 ± 3.7698 grams in ROSS 308 and 316.6311 ± 1.7505 grams in COBB 500, and differences noticed are highly significant statistically between the two hybrids.

In year II and season 1 it was found a value of 263.1595 ± 2.9769 grams in ROSS 308 and 317.4594 ± 2.2162 grams in COBB 500 and differences noticed between the two hybrids are highly significant statistically. In season 2 it was found a value of 257.9397 ± 2.5732 grams in ROSS 308 and 320.6270 ± 1.7459 grams in COBB 500 and differences have been very significant from a statistical point of view.

ACKNOWLEDGEMENTS

This research work was carried out with the support of S.C. Avicola Crevedia S.A.

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