

STUDIES ON THE CHEMICAL COMPOSITION OF CAPON MEAT (CASTRATED ROOSTER) OBTAINED FROM HUBBARD HYBRID

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Abstract

The study focused on the chemical composition (water content, dry matter content and mineral content) of capped meat (castrated rooster) obtained from the Hubbard hybrid. In this regard, were formed two batches of Hubbard roosters from the same breeder of the same age. An experimental batch, noted Lexp-1, consisting of castrated roosters at the age of 8 weeks, and a control batch, noted Lm-1, composed of uncastrated roosters. At the age of 20 weeks, the birds from the two batches were slaughtered. In this study, physicochemical analyses were carried out on the following muscle groups: wing muscles, the pectoral muscles, the upper thigh muscles, respectively the drumstick muscles from Hubbard's capons and roosters. The percentage of water varies noticeably between the two batches studied. In case of breast, the roosters from Lm-1 recorded 1.49% (73.43%) more water than the capons of Lexp-1 (71.94%), respectively, in case of drumstick, the roosters from Lexp-1 recorded a water content of 1.32% (75.24%) higher than uncastrated roosters (73.92%). Regarding the dry matter content, the notable differences registered between the two groups in case of the breast, the castrated roosters from Lexp-1 being characterized by a higher value by 1.49% (28.06%) compared to the birds from Lm-1 (26.57%). Also, at the level of drumstick, uncastrated roosters stood out with a value of 1.32% (26.08%) higher than castrated birds (24.76%). In terms of mineral content, there weren't notable differences for the anatomical portions analysed. The highest ash content was determined for the chest, both batches being characterized by a value of 1.22%, while the lowest percentage of mineral substances was 1.09 for the upper thighs of capons. We recommend further research in this direction.

Key words: capon, Hubbard, percentage of water, percentage of dry matter, percentage of mineral

INTRODUCTION

Although it has been known for centuries in different parts of the world, caponisation of roosters are practiced mainly in small households and farms.

According to Regulation of European Commission 543/2008 of 16 June 2008, the capon is a male bird whose testicles have been surgically removed before reaching sexual maturity and which have been slaughtered at a minimum age of 140 days [2].

From a trophic-biological point of view, meat is the main food with a plastic and energetic role [1].

In the last few years, poultry meat production and demand have increased significantly globally. In 2019, Romania slaughtered almost 300 million birds and produced over 672,000 tons of meat, of which 70% was chicken. The average consumption of poultry meat in 2018 was 24.8 kg per capita, ranking second after pork. According to the European Commission's 2018 outlook report, poultry production and consumption in the European Union is expected to increase by 4% between 2018 and 2030 [3].

With such a high production and demand for fresh poultry, the market is geared towards niche raw materials, which are treated as exclusive and of very high quality. Such a product can be considered capon meat, which is known to be tender, marbled and characterized by a special taste and flavour.

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MATERIAL AND METHOD

The biological material was represented by 30 roosters belonging to the Hubbard hybrid, divided into two groups of experience (experimental group-Lexp, consisting of 20 heads; control group-Lm, consisting of 10 heads).

The difference between the groups was that the males from Lexp underwent surgical castration at the age of 8 weeks. Castration of roosters was performed by the method of bilateral laparotomy in the last intercostal space, puncturing the air sacs, bring to the fore the testicles, by means of a special forceps, then performing orchiectomy by unlimited torsion. The wound suture was made in a continuous thread.

The breeding of the birds took place in the conditions provided by the bio-base of the University for Life Sciences from Iași, in a specially arranged space, on permanent bedding, in breeding pens where was ensured a density of 10 birds / pen, each bird having 2.1 m². Both batches were raised under identical growing conditions, received the same combined feed characterized by a protein level of 17% and an energy value of 2800 kcal / kg.

At the age of 20 weeks, all the birds were slaughtered, on which occasion the

quantitative meat production was evaluated, in the light of the following indicators:

The determination of the percentage of water was performed by the oven drying method.

The determination of the percentage of dry matter was achieved by difference, applying the formula:

$$\text{Dry matter\%} = 100 - \text{water \%}$$

The determination of the percentage of mineral was performed by the calcination method. The data obtained were statistically processed, calculating the arithmetic mean, the standard deviation of the mean and the coefficient of variation.

RESULTS AND DISCUSSIONS

The percentage of water. The chemical analyses performed on the wings to determine the water content showed for Lexp-1 an average of $72.41 \pm 0.03\%$, the minimum value being 72.29% and the maximum 72.47%. The variability coefficient for those two batches ($V\%=0.01-0.10$) reflected a very good homogeneity (Tab. 1). In case of Lm-1 uncastrated roosters, the calculated average was $72.49 \pm 0.0\%$, with a minimum of 72.48% and a maximum of 72.50%.

Table 1 Proportion of water in anatomical portions

	Lexp-1				Lm-1			
	$\bar{X} \pm S_{\bar{X}}$ (%)	V %	Min. (%)	Max. (%)	$\bar{X} + S_{\bar{X}}$ (%)	V %	Min. (%)	Max. (%)
Wings	72.41±0.03	0.10	72.29	72.47	72.49±0.0	0.01	72.48	72.50
Breast	71.94±0.0	0.01	71.93	71.95	73.43±0.0	0.01	73.42	73.44
Upper thighs	71.50±0.01	0.02	71.48	71.51	71.23±0.01	0.03	71.20	71.25
Drumstick	75.24±0.01	0.04	75.21	75.29	73.92±0.0	0.0	73.92	73.92

The water content of the pectoral muscles recorded an average value of 71.94%, with a minimum of 71.93% and a maximum of 71.95% for individuals in Lexp-1. The roosters from Lm-1 registered a minimum percentage of water in the pectoral muscles in the amount of 73.42, a maximum of 73.44%, the average being 73.43%.

At the level of the upper thighs Lexp-1 was distinguished by an average water content of $71.50 \pm 0.01\%$, while for Lm-1 an average of $71.23 \pm 0.01\%$ was calculated.

Following the determination of the water content of the drumstick, for Lexp-1 an average value of $75.24 \pm 0.01\%$ was obtained with variation limits between 75.21% and 75.29%, and for Lm-1 the calculated average was 73.92 ± 0.0 with a constant value of 73.92%; the value of the variability coefficient was 0.04%, which indicates a very good homogeneity of the analysed parameter (Fig. 1).

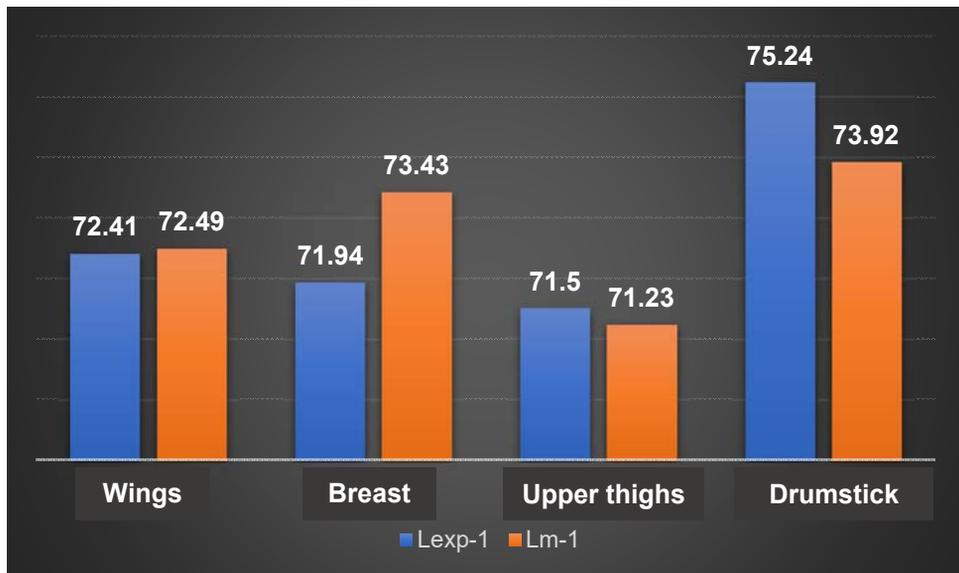


Fig. 1 The proportion of water of anatomical parts

The percentage of dry matter. For the wings of the Lexp-1 capons, was calculated an average of $27.59 \pm 0.03\%$, the minimum value being 27.53% and the maximum 27.71%. For uncastrated roosters from Lm-1,

the percentage of dry matter recorded an average of 27.51%, with a minimum of 27.50% and a maximum of 27.52%, the coefficient of variability ($V\% = 0.03-0.26$) denoting a very good homogeneity (Tab. 2).

Table 2 The proportion of dry matter of anatomical parts

	Lexp-1				Lm-1			
	$\bar{X} \pm S_{\bar{X}}$ (%)	V %	Min. (%)	Max. (%)	$\bar{X} + S_{\bar{X}}$ (%)	V %	Min. (%)	Max. (%)
Wings	27.59±0.03	0.26	27.53	27.71	27.51±0.0	0.03	27.50	27.52
Breast	28.06±0.0	0.02	28.05	28.07	26.57±0.0	0.04	26.56	26.58
Upper thighs	28.50±0.01	0.04	28.49	28.52	28.77±0.01	0.07	28.75	28.80
Drumstick	24.76±0.01	0.12	24.71	24.79	26.08±0.0	0.01	26.08	26.08

In case of breast, for individuals from Lexp-1 was obtained an average value of dry matter content of 28.06%, with a minimum of 28.05% and a maximum of 28.07%; regarding the uncastrated roosters from Lm-1, the calculated minimum was 26.56% and the maximum was 26.58%, resulting in an average of 26.57%.

As regards the upper thighs, the capons of Lexp-1 recorded an average of dry matter

$28.50 \pm 0.01\%$, while for the roosters from Lm-1 was calculated an average of $28.77 \pm 0.01\%$. Following the determination of the dry matter content for the drumstick, was obtained an average value of $24.76 \pm 0.01\%$, for Lexp-1 roosters the variation limits between 24.71% and 24.79%, and for Lm-1 individuals the average was 26.08% (Fig. 2).

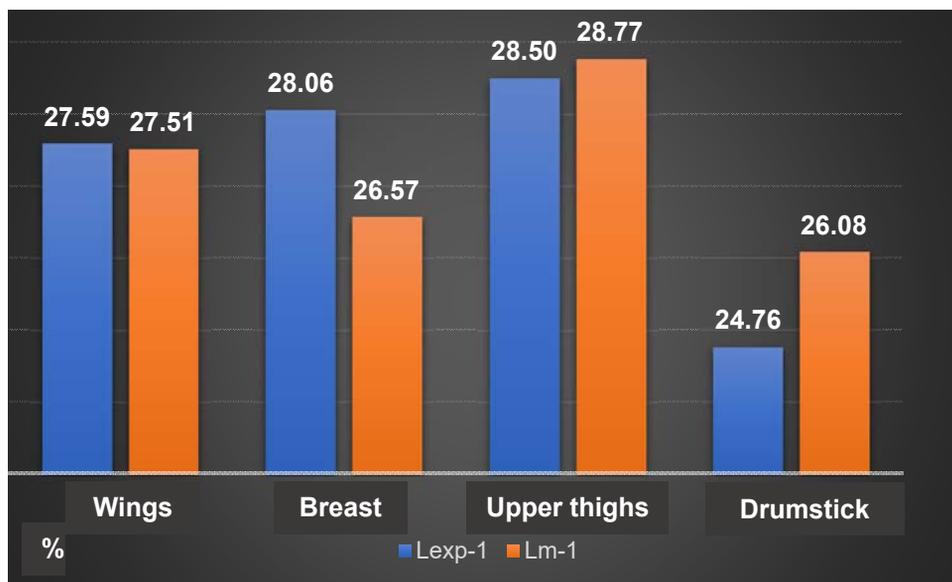


Fig. 2 The proportion of dry matter of anatomical parts

The percentage of mineral. For capons (Lexp-1) as for the wings, the mean value for mineral content was $1.13 \pm 0.01\%$ (1.11% minimum, 1.16% maximum), while for Lm-1 roosters the mean recorded was 1.10% (minimum of 1.09%, maximum of 1.11%). The value of the coefficient of variation ($V\% = 0.73-1.91\%$) indicates a very good homogeneity. For the breast it was observed that the average recorded for castrated roosters was $1.22 \pm 0.01\%$ (minimum 1.19% and maximum 1.24%), and for uncastrated roosters the content in mineral substances registered an average of

$1.22 \pm 0.02\%$, amid some limits of variation in the range of 1.18-1.30% (Tab.3).

Regarding the mineral content in the upper thighs, Lexp-1 recorded an average of $1.09 \pm 0.01\%$, while for Lm-1 was calculated an average of $1.12 \pm 0.01\%$. As a result, the determination of the ash content of the drumstick for capons, Lexp-1, was obtained an average value of $1.11 \pm 0.01\%$ with variation limits between 1.09% and 1.13%, and for roosters, Lm-1, the average was $1.12 \pm 0.01\%$, with a minimum of 1.10% and a maximum of 1.14% (Fig. 3).

Table 3 The percentage of mineral of anatomical parts

	Lexp-1				Lm-1			
	$\bar{X} \pm S_{\bar{X}}$ (%)	V %	Min. (%)	Max. (%)	$\bar{X} + S_{\bar{X}}$ (%)	V %	Min. (%)	Max. (%)
Wings	1.13 ± 0.01	1.91	1.11	1.16	1.10 ± 0.0	0.73	1.09	1.11
Breast	1.22 ± 0.01	1.51	1.19	1.24	1.22 ± 0.02	3.79	1.18	1.30
Upper thighs	1.09 ± 0.0	0.59	1.09	1.10	1.10 ± 0.01	1.21	1.09	1.11
Drumstick	1.11 ± 0.01	1.58	1.09	1.13	1.12 ± 0.01	1.42	1.10	1.14

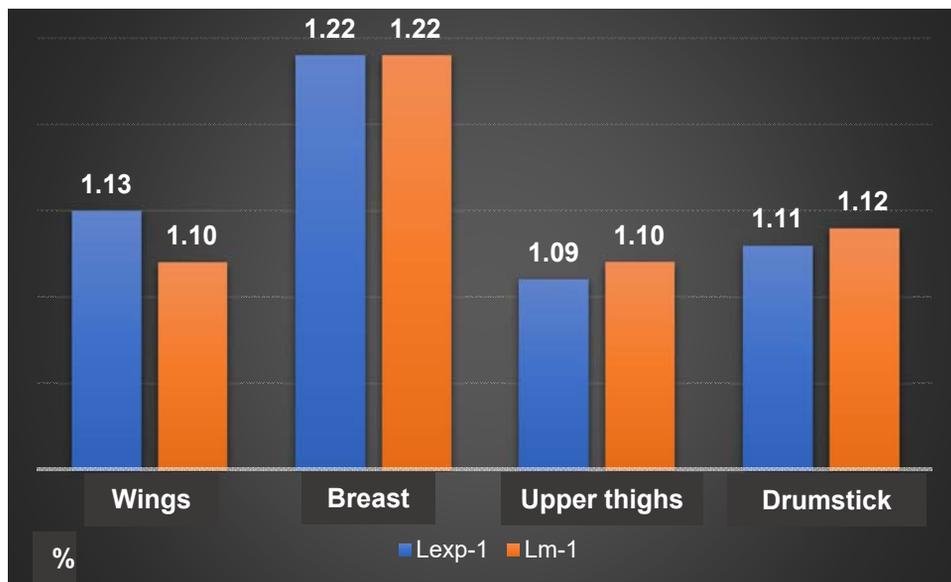


Fig. 3 The percentage of mineral of anatomical parts

CONCLUSIONS

The values obtained for the capons belonging to the Hubbard hybrid, following the analysis of the chemical composition, led to the following conclusions:

- the percentage of water registered remarkable differences between the two groups studied, in case of roosters from Lm-1, breast containing 1.49% more water than Lexp-1, respectively, in case of drumstick, capons having a water content 1.32% higher than Lm-1;
- the percentage of dry matter was markedly different between the two batches, Lexp-1 being with 1.49% higher than Lm-1 in the case of breast, while Lm-1 was 1.32% higher than Lexp-1 in case of the drumstick;
- regarding the content in mineral substances, weren't noticed differences on anatomical parts of the two batches taken in the analysis. The highest ash content was determined for the breast, both batches being characterized by a value of 1.22%, while the lowest percentage of mineral substances was set at 1.09 for the upper thighs of Lexp-1.

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