RESEARCH ON THE QUALITY OF MEAT FOLLOWING SLAUGHTER

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Abstract

The appreciation of the quality of the meat is made multifactorial only through the physico - chemical factors to exclude any level of subjectivity from appreciation. The paper presents research on hybrid BUT 6, intensively grown, referring to color, softness, texture of the meat, boiling losses. To express the color of turkey meat, the brightness was determined, which depends on the light reflection power. The tenderness of the turkey meat determines its taste value being determined by the ease with which it is cut or chewed. Expression of fleshiness was performed by primary statistics calculated using Warner Bratzler shear forces. The texture of the meat was appreciated by the following coefficients: hardness, cohesiveness, adhesion, guminess, elasticity and masticability. Boiling losses are the ability of the meat to lose a share of its own weight. This technology of meat is a criterion for expressing the water retention capacity of prepared meat. Boiling losses vary according to the structural features of muscle tissue, thicker fibers record a higher rate of water loss.

Very significant results in the expression of the complementary colors of red-green and yellow-blue, as well as a significant difference in cohesiveness between the two anatomical regions studied, were recorded.

Key words: meat, turkey, sensory

INTRODUCTION

A scientific study regarding the quality of the poultry meat answers the current demands of creating an integrated information system related to quality and biosafety assurance within the food chain. [5]

The technological factors involved in meat quality represent a well-founded documentation of the process of food stuffs from raw material to the finished product. [1] The obligations of the producer require the need of a set of product quality characteristics, respectively economical, psycho-sensorial and technical-functional characteristics in order to satisfy the general interests of modern world. [2], [3].

Detailing the complexity of the characteristics defining quality requires a scientific analysis so that putting each component in its regular and logical place of the general interpretation to determine the implementation of an adequate management system for the entire production chain. [4]

MATERIAL AND METHOD

Biological material has been studied the Big B.U.T. 6 purchased from Aviagen Turkeys, a global supplier that develops a genetic selection program, bringing continuous improvements to the development of body mass and bird health.

The hybrid of turkey Big B.U.T. 6 is a massive race with rapid growth, being especially used for intensive production. According to the 18-week-old growth guide, females belonging to this hybrid reach an average body weight of 12 kg and males at 22 weeks reach 22 kg.

The evolution of the hybrids has been pursued in growth farms belonging to S.C. Galli-Gallo S.R.L, Codlea. The biological material of the Big BUT 6 hybrid was taken from 30 individuals (males and females) from the L1 experimental groups (2550 individuals) sacrificed at 16 weeks and L2 (2500) brought to the 18 week slaughter age, in 2 blind rooms each with a surface area of 930 m^2 and 850 m^2 during growth period I, after which you moved to another 2 halls with a surface of 1380 m^2 each in the growing period II.

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Method of work used to determine the color of the meat. As far as the color of the meat is concerned, it was expressed by the coordinates L *, a *, b * in the CIE Lab colorimeter (AMSA), corrected by the DIN 99 equation measured by the included spectral component (SCI).

The operating principle of the spectrophotometer applies the specifications given in "CIE Colorimetry Second Edition, Publication 15.2 (1986)".

As a method, the actual measurement was performed in three different areas of each muscle sample, at 8 ÷ 10°C, with the Minolta CM-2600d Portable Spectrophotometer, being set to view at the standard angle of 10° with a the illuminating beam D 65 in the CIE Lab Colorimeter.

The method used to determine the fleshiness of the flesh through Warner Bratzler forces. In order to perform this determination, the meat samples were subjected to a boiling baking heat treatment for 45 minutes. at 75°C (in polyethylene bags), then packed in aluminum foil, preserved for 24 hours at 4°C and cut into cylindrical shape (3 cylinders 1.5 cm in diameter and 2 cm in length) in the direction of the muscle fibers.

The NEXYGEN Ondio software integrated with the TaPlus Series Texturer allowed the shear force values to be calculated directly according to the cutting-deformation curve, expressed as peak values corresponding to the maximum value recorded (Honikel, 1998). At the same time, the system ensures the operation of the texture meter according to the requirements of BS EN ISO 7500: 1999.

Method used to determine meat texture (TPA). In order to analyze the texture of the samples taken from the experimental groups L1 and L2 has been required the use of universal Lloyd texturometre Plus LPF in order to apply compressive force to the muscle samples into a cylinder and obtain a final deformation of the original height of the sample. This was done using a flat-head cylinder of Ø = 45 mm that obtained an alternative movement that mimics the action of the human jaw.

The Llyod LFP plus dynamometer was used to perform the mechanical determination, the meat samples being in the form of 20 mm Ø and H cylinders, obtaining the results involving the use of a flat face presser with a Ø = 45 mm. The actual determination involved a double compression, with an intermediate pause between 5 second compression at a speed of 10 mm / min. and a final deflection of 80% of the initial height of the test sample to be tested.

Analysis of the force-time curve of TPA instrumental method yielded five instrumental parameters (hardness, cohesiveness, gumozitate, elasticity and chewiness) showing a sample of the force-deformation curve and parameters of TPA.

Expression of the results was done with the NEXYGEN Ondio software, integrated with the textrometr, which allowed the recording and the direct calculation of the values of each textural descriptive parameter.

RESULTS AND DISCUSSIONS

The color of the meat (Table 1) is determined by the content of the muscle in myoglobin, hemoglobin, carotenoids and cytochrome C. After sacrificing the animal, myoglobin is found to be in reduced form. The color of the flesh is of pink color. In the first 4 mm of muscle thickness myoglobin is in oxygenated form, the color of the meat being of a pink light. Under the conditions of prolonged exposure of the meat to the air due to the oxidation processes, methioglobin appears to give it a pink-brown color, which is disagreeable for the consumer.

The expression of brightness is influenced by important factors of the growth system, such as nutrition, which in turn is reflected in the ratio of meat to fat and slaughter factors, bleeding.

The curdiness of the turkey determines the taste value of the chicken being determined by the ease with which it is cut or chewed. and Expression of the fleshiness of the meat was carried out by the primary statistical indicators calculated by Warner Bratzler shear forces. (Table 2)

The texture of the meat was appreciated by the following coefficients: hardness, cohesiveness, adhesion, gumminess, elasticity and masticability. (Table 3)

After analyzing the data in the table, there is a significant difference in cohesiveness between the two anatomical regions studied.

During conditioning, storage and processing, the meat suffers weight loss due to the partial evaporation of water, the loss of meat juice by cutting, chopping, defrosting and changing the fat content following drying and heat treatment.

Boiling losses are the ability of the meat to lose a share of its own weight. This technology of meat is a criterion for expressing the water retention capacity of prepared meat. Boiling losses vary according to the structural features of muscle tissue, thicker fibers record a higher rate of water loss. (Table 4)

There were no significant differences between the muscles of the two anatomical regions studied, the values being close.

Table 1 Colorimetric parameters of turkey hen meat

Specifi-cation	n	Lots analyzed	Calculated statistical indicators				THE MEANING
			$\overline{X} \pm s_{\overline{x}}$	V%	Min.	Max.	
L*	10	**Chest**	47.64±0.48	3.24	45.39	50.34	$\hat{F}$= 1.13; $F_{0.05}$ = 4.41; $\hat{F} < F_{0.05}$ => n.s
		Upper pulp	46.52±0.93	6.34	39.64	49.33	
a		**Chest**	-0.88±0.19	-70.07	-1.93	-0.15	$\hat{F}$= 40.37; $F_{0.001}$ = 15.38; $\hat{F} > F_{0.001}$ => ***
		Upper pulp	4.13±0.74	58.55	1.5	9.15	
b		**Chest**	7.89±0.27	10.83	6.3	9.15	$\hat{F}$ = 33.81; $F_{0.001}$ = 15.38; $\hat{F} > F_{0.001}$ => ***
		Upper pulp	11.47±0.55	15.21	8.32	13.68	

L * = brightness; a * = Coordinate of complementary colors red-green; b * = Coordinate of complementary colors yellow-blue

Table 2 Warner Bratzler shear forces (N/cm^2)

Specifi-cation	n	Lots analyzed	Calculated statistical indicators				THE MEANING
			$\overline{X} \pm s_{\overline{x}}$	V%	Min	Max.	
Textura WB	**10**	**Chest**	10.70±0.85	25.26	7.32	15.64	$\hat{F}$ = 0.31; $F_{0.05}$ = 4.41; $\hat{F} < F_{0.05}$ => n.s
		Upper pulp	10.08±0.68	21.52	6.12	13.25	

Table 3 Texture estimation of turkey hen meat

Specification	n	Lots analyzed	Calculated statistical indicators				THE MEANING
			$\overline{X} \pm s_{\overline{x}}$	V%	Min.	Max.	
Hardness	10	**Chest**	16.53±1.18	22.58	8.76	21.25	$\hat{F}$ = 1.18; $F_{0.05}$ = 4.41; $\hat{F} < F_{0.05}$ => n.s
		Upper pulp	46.52±0.93	6.34	39.64	49.33	
Cohesiveness		**Chest**	0.31±0.01	11.48	0.27	0.36	$\hat{F}$ = 4.59; $F_{0.05}$ = 4.41; $\hat{F} > F_{0.05}$ => *
		Upper pulp	4.13±0.74	58.55	1.5	9.15	
Adhesiveness		**Chest**	0.01±9.03	205.20	0.02	0.09	$\hat{F}$ = 1.98; $F_{0.05}$ = 4.41; $\hat{F} < F_{0.05}$ => n.s
		Upper pulp	1.18±1.76	46.95	0.04	0.021	
Gumozitate		**Chest**	5.52±0.56	32.34	2.46	8.54	$\hat{F}$ = 0.74; $F_{0.05}$ = 4.41; $\hat{F} < F_{0.05}$ => n.s
		Upper pulp	47.64±0.48	3.24	45.39	50.34	
Elasticity		**Chest**	0.41±0.03	23.80	0.30	0.63	$\hat{F}$ = 1.26; $F_{0.05}$ = 4.41; $\hat{F} < F_{0.05}$ => n.s
		Upper pulp	0.45±0.02	17.87	0.36	0.59	
chewiness		**Chest**	2.06±0.32	49.70	0.85	4.58	$\hat{F}$ = 1.77; $F_{0.05}$ = 4.41; $\hat{F} < F_{0.05}$ => n.s
		Upper pulp	2.61±0.25	30.60	1.04	3.63	

Table 4 Losses by boiling (gr.)

Specification	n	Lots analyzed	Calculated statistical indicators				THE MEANING
			$\overline{X} \pm s_{\overline{x}}$	V%	Min.	Max.	
PF (gr.)	**4**	**Chest**	18.55±1.45	15.71	15.70	22.60	$\hat{F}$ = 2.15; $F_{0.05}$ = 5.99; $\hat{F} < F_{0.05}$ => n.s

CONCLUSIONS

Analyzing the results, we notice that there is no significant difference in the lightness of the meat between the chest and the upper pulp.

Very significant results were found in the co-expression of the complementary colors red-green and yellow-blue, the difference that can be argued by the different muscular activity of the two categories taken in the analysis. Higher pulse muscles recorded higher values due to the fact that muscle activity results in increased myoglobin content.

Following the interpretation of the obtained results there were no significant differences between the muscle categories taken in the analysis.

In the case of pectoral muscles, the boiling losses were 18.55 g and in the case of muscles on the upper pulp the recorded value was 22.93 g.

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