

ATTRIBUTES RELATED TO TENDERNESS IN BREAST MEAT OF BROILERS WITH DIFFERENT GENDERS AND AGES AFTER AGING

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Abstract – The aim of this study was to evaluate the attributes related to tenderness of breast meat in broilers of fast growth lineage with two different genders and ages, after aging. *Pectoralis major* muscle from deboned carcasses was purchased in a commercial slaughterhouse and used in this study. A completely randomized design in 2x2x3 factorial was used with two ages, two genders and three aging periods, in ten replications. As the age of birds increases, there is a reduction of cooking weight loss, an increase of collagen percentage and, consequently, increased shear force. The meat from males showed greater cooking weight loss, higher collagen percentage and therefore increased shear force. The aging process promoted an increase of cooking weight loss and reduction of the collagen percentage and shear force, after three days of storage. The variables studied showed no significant difference between three and seven days of storage. The age of bird reduces cooking weight loss, increases the collagen content and consequently affects tenderness of breast meat. The gender of broilers influences the cooking weight loss, collagen percentage and tenderness of breast meat. The aging process favors the meat softening from spent birds.

I. INTRODUCTION

The aging of meat is a period during which significant changes in quality parameters and microstructure of muscle, especially related to texture, tenderness, water holding capacity and sensory properties of meat so that the muscle to meat conversion occurs properly, significantly influencing the palatability [1].

After slaughter, meat of spent birds is usually used in the formulation of emulsified sausages, burgers, among others, and may also be sold at a lower price than conventional chicken, a viable way to give the appropriate destination at the end of production and add value to this unexplored poultry segment.

Thus, the aim of this study was to evaluate some attributes related to tenderness of broilers and spent birds meat after aging for up to seven days, so that aging process can be used as a

softening technique that adds value for this type of product.

II. MATERIALS AND METHODS

This study was developed in Technology Laboratory of Animal Products in São Paulo State University – UNESP, Jaboticabal, São Paulo, Brazil.

Carcasses from 120 broilers of fast growth lineage, males and females with 42 days of age and spent birds (approximately 70 weeks of age) purchased from a commercial slaughterhouse, were used in this study.

After deboned, samples from *Pectoralis major* muscle (breast) were individually vacuum packed and stored in a BOD chamber, under $\pm 2^{\circ}\text{C}$ for 3 and 7 days.

Cooking weight loss, shear force and collagen percent were analyzed.

The cooking weight loss was determined by cooking the samples in a water bath according to methodology described by Honikel [2]. From cooked samples subsamples with known area (cm^2) were obtained and submitted to cut in Texture Analyser TA-XT2i texturometer coupled to Warner Bratzler device, which determined the shear force in kgf. The collagen percent was determined by quantification of hydroxyproline amino acid according to the methodology proposed by Woessner Junior [3].

For statistical analysis a completely randomized design in 2x2x3 factorial was used with two ages (broilers at 42 days of age and spent birds at approximately 70 weeks), two genders and three aging periods, in ten replications. Data were submitted to analysis of variance and means compared by Tukey test (5%) using the statistical program SAS [4].

III. RESULTS AND DISCUSSION

Table 1 shows the average results obtained from cooking weight loss, shear force and

collagen percent analysis of broilers and spent birds meat, subjected to aging process for up to seven days.

It is observed that with increasing of bird age, there is a reduction of cooking weight loss because meat from older birds has higher water holding capacity. The meat from spent birds showed an increase of collagen percentage and, consequently, increased shear force, reducing the tenderness.

Table 1 Cooking weight loss (CWL), shear force (SF) and collagen percent in breast meat of broilers with different genders and ages

	CWL (%)	SF (kgf/cm ²)	Collagen (%)
Age (A)			
42 days	29.90 A	2.194 B	3.74 B
70 weeks	27.91 B	2.669 A	5.44 A
Gender (G)			
Male	30.18 A	2.665 A	5.36 A
Female	27.63 B	2.198 B	3.82 B
Aging periods (T)			
Control group	26.81 B	3.489 A	4.97 A
3 days	29.98 A	1.928 B	4.29 B
7 days	29.92 A	1.877 B	4.51 B
P-value (A)	0.0001	<0.0001	<0.0001
P-value (G)	<0.0001	<0.0001	<0.0001
P-value (T)	<0.0001	<0.0001	<0.0001
CV (%)	9.39	11.53	12.52

Averages followed by different letters differ according to Tukey's test. The following abbreviations are used: CV: coefficient of variation;

The meat from males showed greater cooking weight loss, higher collagen percentage and therefore increased shear force.

The aging process promoted an increase of cooking weight loss and reduction of the collagen percentage and shear force, after three days of storage. The variables studied showed no significant difference between three and seven days of storage. According Hadlich et al. [5] the gender influences collagen content, while males have a higher amount of intramuscular connective tissue than females.

Roça [6] reports that during the aging process of meat occurs a slight increase in water holding capacity due to the higher pH and enzymatic degradation of myofibrillar

structure. Thus, the exudate liquid volume decreases and, consequently, the storage weight loss. However, an increase in the water holding capacity does not prevent the increase of cooking weight loss, which possibly due to relaxation of muscle fibers during aging process.

According Vaithyanathan et al. [7], during aging of meat from spent hen breast, there are many changes in the structural proteins degradation and tenderization. These changes in the structural proteins improved the tenderness of spent hen breast meat stored at low temperatures. This improvement in tenderness through postmortem aging may be considered as an option to add market value to spent hen breast muscle.

IV. CONCLUSION

The age of bird reduces cooking weight loss, increases the collagen percent and consequently affects tenderness of breast meat. The gender of broilers influences the cooking weight loss, collagen percent and tenderness of breast meat. The aging process favors the softening of meat from spent birds.

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