EVALUATION OF ATTRIBUTES RELATED TO JUICINESS AND TENDERNESS OF BREAST MEAT OF SPENT BIRDS, COCKS AND BREEDER HENS, AFTER AGING

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Abstract – The aim of this study was to evaluate some attributes related to juiciness and tenderness of spent birds, cocks and breeder hens, after aging for up to seven days. Ten carcasses of spent hens of Cobb lineage and ten Cobb cocks carcasses, were purchased from a commercial slaughterhouse and used in this study. The water-holding capacity, cooking weight loss and shear force were evaluated, after aging for until seven days, in B.O.D chamber, about 3°C of temperature. The gender of the birds did not influence the water-holding capacity of meat, however, the cooking weight loss was higher to the meat from cocks, with a consequent reduction in tenderness when compared to meat from females. The aging period influenced the three variables studied. In low temperature storage, the water-holding capacity was reduced and cooking weight loss increased. In contrast, the aging process was increased the meat tenderness, regardless of birds gender. The meat of cocks is tougher and loses more weight during cooking than meat of breeder hens, regardless the aging time. The aging process for at least three days improves softening of breast meat of spent birds.

Key Words – Broilers, Maturation, Shear force

I. INTRODUCTION

When they reach the end of the production cycle, birds are excluded from the breeding stock and are characterized by having a rigid meat texture mainly due to the increased concentration of collagen [1]. In advanced age of birds, there is a formation of irreducible links between collagen molecules of the muscle that directly affect the tenderness of the meat and its ability to retain water [2].

After slaughter, spent birds meat 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 juiciness and tenderness of spent birds, cocks and breeder hens, 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. Ten carcasses of spent hens of Cobb lineage and ten Cobb cocks carcasses, were purchased from a commercial slaughterhouse and used in this study. After deboned, the *Pectoralis major* (breast) muscle were collected. The water-holding capacity (WHC), cooking weight loss (CWL) and shear force (SF) were evaluated after aging for until seven days, in B.O.D chamber, about 3°C of temperature. The WHC was determinate according Hamm [3], using 2 g of deboned muscle. These samples were placed between two filter papers and acrylic plates, and submitted to the pressure exerted by a weight of 10 kg for five minutes. Then, samples were re-weighed to determine the WHC by difference between initial and final weight, expressed as a percentage.

To determine the CWL, samples were cooked in a water bath according to methodology described by Honikel [4]. From cooked samples were obtained subsamples with known area (cm^2), submitted to cut in Texture Analyser TA-XT2i

texturometer coupled to Warner Bratzler device, which determined the shear force in kgf.
For statistical analysis a completely randomized design in 2x3 factorial was used with two genders and three times of aging, in ten replications. Data were submitted to analysis of variance and means were compared by Tukey test (5%) using the SAS statistical program [5].

III. RESULTS AND DISCUSSION

Table 1 shows the average results obtained in the analysis of water-holding capacity (WHC), cooking weight loss (CWL) and shear force (SF) of spent bird meat subjected to the aging process for seven days.
The gender of birds did not influence the water-holding capacity of meat, however, the cooking weight loss was higher to the meat of cocks, with a consequent reduction in tenderness as compared to meat from females.
The aging period influenced the three variables studied. The storage in low temperatures reduced the water-holding capacity and increased the cooking weight loss. On the other hand, the aging process increased the meat tenderness (SF reduction), regardless the gender of birds.

Table 1 Water-holding capacity (WHC), cooking weight loss (CWL) and shear force (SF) of meat of spent breeder hens and cocks, after aging

	WHC (%)	CWL (%)	SF (kgf/cm²)
Gender (G)			
Males	70.54 A	31.10 A	3.134 A
Females	70.66 A	25.65 B	1.945 B
Aging (A) (days)			
0	71.74 A	25.11 B	3.409 A
3	70.28 AB	29.78 A	2.058 B
7	69.79 B	30.23 A	2.151 B
P-value (G)	0.8517	<0.0001	<0.0001
P-value (A)	0.0347	0.0007	<0.0001
P-value Int. (GxA)	0.6341	0.9407	0.7759
CV (%)	3.40	15.55	14.83

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

During aging occurs change in muscle structure whose degradation of the proteins that make up the muscle contributes to the weakening of myofibril structure, which leads to softening after slaughter. The tenderness is resulting of the efficiency with the enzymatic degradation occurred to disrupt myofibrils compressed during the process of *rigor mortis*.
Regarding to CWL, Garcia et al. [6] evaluated the quality of broiler breast fillets subjected to different periods of aging observed that cooking weight loss was reduced after 24 hours of aging, remaining constant after this period.
In this study it was found that cooking weight loss increases as aging time increases, possibly due to reduced in water-holding capacity of the meat. In contrast, Komiyama et al. [7] found no effect of aging on cooking weight loss in breast meat of breeder hens, with values ranging from 24.74 to 27.13 within 48 hours of aging.
Roca [8] reports that during the meat aging the water-holding capacity increases due to the small increase in pH and enzymatic degradation of myofibrillar structure, unlike the results obtained in this study, which had reduced WHC along of aging time.
Shear force decreased after three days of aging, as well as the results found by Kriese et al. [9] and Komiyama et al. [7], indicating that low temperature of cooling improves the softening of the breast meat and that it is possible to make the meat of disposal birds fit for domestic consumption.

IV. CONCLUSION

The meat of cocks is tougher and loses more weight during cooking than meat of breeder hens, regardless the aging time. The aging process for at least three days improves softening of breast meat of spent birds.

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