

## LOSSES DUE AGING PROCESS IN BREAST MEAT OF BROILERS WITH DIFFERENT GENDERS AND AGES

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**Abstract – The aim of this study was to evaluate the possible losses due aging process, related to the quality of breast meat in broilers of fast growth lineage. *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. The meat of birds in slaughter age (42 days old) had higher storage weight loss, higher exudate volume and lower soluble protein. The gender of birds influenced the storage weight loss and the quantity of soluble protein present in the exudate fluid. The meat of males showed higher storage weight loss and lower soluble protein. The lipid oxidation was not influenced by age and gender of birds. The longer the aging period, the higher is the storage weight loss, the exudate volume and the lipid oxidation of samples. The age, gender of birds and time of aging affect the storage weight loss of meat as well as the quantity of soluble protein lost in the exudate fluid. The increase of the aging period favors the lipid oxidation in the meat of broilers.**

### I. INTRODUCTION

With advancing age, lots of cocks and hens are discarded by showing a rigid meat, mainly due to the increased collagen concentration.

Females are usually large birds, weighing approximately 3-4 Kg, whose body shape is similar to a broiler, with very developed breast muscles and legs [1]. However, they have a large fat deposition, both subcutaneous and abdominal and the meat is tougher and less juicy.

Due to low consumer preference for this meat because of their sensory quality, it becomes necessary to seek alternative techniques, such as maturation, that add value and enable consumption of this meat as prime beef and not as by-products.

Thus, the aim of this study was to evaluate the possible losses due aging process regarding to breast meat quality of broilers.

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

Storage weight loss, exudate volume, soluble protein in the exudate and lipid oxidation were analyzed. The storage weight loss was determinate by difference between initial and final weight, before and after aging, expressed as percentage. The dosage of the soluble protein in the exudate was performed according Hartree [2]. Lipid oxidation was evaluated by measuring the substances reactive to thiobarbituric acid-2 (TBARS) according to the methodology proposed by Pikul et al. [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 storage weight loss, exudate volume, soluble protein in the exudate and lipid oxidation analysis of broilers and spent birds meat, subjected to aging process for seven days. The age of birds influenced storage weight loss, the exudate volume and the quantity of soluble protein present in the exudate fluid. The meat of

birds in slaughter age (42 days old) showed higher storage weight loss, higher exudate volume and lower soluble protein.

Table 1 Storage weight loss (%), exudate volume (mL/g sample), soluble protein in the exudate (mg protein/mL drip) and lipid oxidation (mg MDA/Kg sample) in breast meat of broilers with different genders and ages

	SL	Exudate	SP	TBARS
Age (A)				
42 days	2.95 A	0.025 A	0.154 B	0.135
70 weeks	1.50 B	0.010 B	0.174 A	0.134
Gender (G)				
Male	2.31 A	0.018	0.160 B	0.134
Female	2.14 B	0.017	0.168 A	0.135
Aging periods (T)				
Control group	-	-	-	0.116 C
3 days	1.66 B	0.012 B	0.179 A	0.138 B
7 days	2.78 A	0.023 A	0.149 B	0.149 A
P-value (A)	<0.0001	<0.0001	<0.0001	0.6664
P-value (G)	0.0042	0.0569	<0.0001	0.5618
P-value (T)	<0.0001	<0.0001	<0.0001	<0.0001
CV (%)	11.61	15.60	4.18	8.33

Averages followed by different letters differ according to Tukey's test. The following abbreviations are used: SL: Storage weight loss; SP: Soluble protein in the exudate; TBARS: lipid oxidation; CV: coefficient of variation;

The gender of birds influenced the storage weight loss and the quantity of soluble protein present in the exudate fluid. The meat of males showed higher storage weight loss and lower soluble protein. The lipid oxidation was not influenced by age and gender of the birds.

The aging process influenced these variables. As aging period increases, the storage weight loss also

increases due to greater loss of exudate fluid. There was an increase in lipid oxidation.

Bowker and Zhuang [5] evaluating the relationship between the composition of exudate liquid and breast meat quality of broilers, concluded that this composition and volume may change depending on pH, color and water holding capacity of meat.

Vaithyanathan et al. [6] studying the aging process of breast meat from spent hens with 72 weeks of age, observed the increase in TBARS value over the time.

Lipid oxidation is an important reaction which limits the shelf life of foods, it is one of the primary mechanisms of meat quality deterioration, especially for samples with higher quantity of fat. The storage of meat under low temperatures, such as during the aging process, can minimize lipid oxidation, however, even in freezing temperatures this is just delayed but not eliminated [7].

During storage the breast meat had a significant increase in the volume of exudate fluid. Roça [8] reports that during the meat aging there is slight increase in water holding capacity due to the higher pH and enzymatic degradation of myofibrillar structure. Thus, the exudate volume decreases and, consequently, decreases the storage weight loss, in contrast to what was observed in this study.

#### IV. CONCLUSION

The age, gender of birds and the time of aging affect the storage weight loss of meat as well as the quantity of soluble protein lost in the exudate fluid. The increase of the aging period favors the lipid oxidation in broiler meat.

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