QUALITATIVE CHARACTERISTICS OF DIFFERENT COMMERCIAL CUTS OF BROILERS REARED UNDER CONVENTIONAL AND FREE-RANGE SYSTEMS

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Abstract – This study aimed to compare qualitative characteristics of commercial cuts (breast and drumstick) of broilers reared under conventional and free-range system. Frozen carcasses of chickens reared in conventional and free-range systems were collected. pH was determined using digital pH meter with direct insertion of the electrode, the water holding capacity (WHC) with samples placed between two filter papers and acrylic plaques under 10 kg pressure. For, shear force (SF) samples were placed with fibers in perpendicular direction to the blade texturometer *Texture Analyzer TA-XT2i* device coupled to *Warner-Bratzler.* A completely randomized design in a 2x2 factorial design were used, two types of cuts (breast and thigh) and two housing systems (conventional and free-range) with 25 repetitions each. There was no interaction between the factors studied (cuts and housing systems) and tight muscles showed higher pH values. The meat of carcasses from the conventional system broilers were less tender and had less capacity to hold water when compared to carcasses from free-range system.

Key Words – Breast, Drumstick, Softness

I. INTRODUCTION

The concept of meat quality is quite wide and complex, since it includes objective and subjective characteristics. The objective characteristics include physical, nutritional and hygienic and subjective ones includes the sensory and product presentations. The main attributes evaluated on the quality of poultry meat are appearance, color, texture, juiciness, nutritional and functional properties. The commercial lineage of broiler differs between free-range lineage in several qualitative parameters of meat. Meat from commercial poultry are pale pink breast and less red compared to colonial or free-range broiler because they are birds with specific lineages for this kind of rearing and to be slaughtered at minimum 85 days. The colonial or free-range system is regulated in Brazil by the Ministry of Agriculture, Livestock and Supply (MAPA) through Circular Letter DOI/DIPOA 007/99 [1]. Which defines the management conditions for this kind of bird and the use of growth promoters are forbidden and the birds must not receive chemotherapy products and animal ingredients in food. From the 28th day of age, the birds must have access to minimum three square-meter paddocks available for each housed bird. The objective of this study was to compare the quality characteristics of *Pectoralis major* muscles and the *tensor fascia lata*, respectively, breast and drumsticks of broilers reared under conventional and colonial or free-range system.

II. MATERIAL AND METHODS

In commercial butcher shops located the State of São Paulo, 100 frozen broiler carcasses were purchased, 50 from birds reared in conventional system and 50 from colonial or free-range system. Preserving the cold chain, samples were sent to the Laboratory of Technology of Animal Products of São Paulo State University to perform qualitative analysis. The pH was determined using a digital pH meter equipped with direct insertion electrode in the corresponding muscles. The water holding capacity (WHC) was evaluated using the methodology described [3] which uses about 2 g of deboned muscle placed between two filter papers and acrylic plaques and receiving pressure of a 10 kg weight for five minutes. Subsequently,

samples were weighed again and the difference between initial and final weights, the WHC, expressed in percentage. The shear force (SF) was determined on samples previously boiled in a waterbath for 30 minutes (85 °C) and cut into approximately 1,5cm² area strips. Samples were submitted to *texturometer Texture Analyzer TA-XT2i* cut, coupled to *Warner-Bratzler* device, with fibers disposed perpendicularly to the machine blade, which expressed the strength required to shear sample kgf/cm^2 [4]. A randomized design in a 2x2 factorial design were used, two types of cuts (breast and thigh) and two housing systems (conventional and colonial or free-range system) with 25 repetitions each. The results were submitted to analysis of variance using the GLM Procedure of SAS operating system [5] and the mean results were compared by Tukey test at 5% significance level.

III. RESULTS AND DISCUSSION

The results obtained for pH, water holding capacity (WHC) and shear force (SF) of boirler cuts reared under conventional and colonial or free-range system are shown in Table 1, where no interaction between studied variables was observed. Regarding the pH, there is no difference between housing systems, besides thigh muscles that showed higher values this studied variable. In the analysis that determines the muscle ability to retain water, there was no difference between muscles and rearing systems evaluated. The drumstick had bigger WHC than chest and broilers from colonial or free-range system also had higher values for this variable. For shear force (SF), variable that determines tenderness of muscles, there was no difference between cuts, except for rearing systems. Birds submitted to the conventional system had less tender meat compared animals from colonial system.

Table 1 Averages for pH, water holding capacity (WHC) and shear force (SF) determination from cuts of broilers reared under conventional and colonial or free-range systems

	PH	**WHC(%)**	**SF(%)**
CUTS (C)			
Chest	6,06 B	63,71 B	0,720
Drumstick	6,60 A	70,12 A	0,824
F Test	13,37**	13,22**	3,66^{NS}
REARING **SYSTEMS (H)**			
Conventinal	6,33	64,45 B	0,908 A
Free-Range	6,34	69,38 A	0,637 B
F Test	0,01^{NS}	7,80*	25,26**
F Int. CxH	0,48^{NS}	3,47^{NS}	3,05^{NS}
CV(%)	4,08	4,56	12,11

For a given factor, means followed by distinct letters differ according to Tukey test. The following abbreviations are used: NS, not significant; and CV, coefficient of variation. *($P < 0.05$); **($P < 0.01$).

When studied the influence of lineage and rearing system of broilers, the author reported that access to outdoor area has effect on meat quality, since the lineage has influence on some parameters such as lower water holding capacity (WHC) and higher shear force in slow-growing chickens (colonial type or free-range lineages) in relation to fast growth lineages [2].

IV. CONCLUSION

The meat of carcasses from the conventional system were less tender and had less capacity to hold water when compared to carcasses from colonial or free-range system.

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