

COLOR, PH AND WATER ACTIVITY EVALUATION OF POULTRY MEAT FROM DIFFERENT CREATIONS POULTRY MEAT

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Abstract – The objective of this study was to compare the qualitative characteristics of *Pectoralis major* muscle of broilers from organic and colonial or free-range rearing system. Carcasses from 100 broilers, 50 from Cobb birds raised under organic system, slaughtered at the age of 45 days and other 50 carcasses from Label Rouge birds raised under colonial or free-range system, with slaughter age of 85 days. The laboratory meat quality such as color, pH and water activity was determined and a completely randomized design (organic and colonial or free-range system) with 50 repetitions each. There was no difference in breast meat from birds to lightness (L*), yellowness (b*) and water activity between rearing systems studied. The redness (a*) was significant for all treatments and pH were higher in organic broiler carcasses. The system used in the creation of birds influence the qualitative characteristics of redness (a*) and pH from *Pectoralis major* muscle of broilers.

Key Words – Feeding, Muscles, Parameters, Quality.

I. INTRODUCTION

The production chain of poultry presents itself as one of the most important agribusiness production chains in Brazil. It is marked by constant technological developments across the involved industry, which result in the achievement of domestic and foreign market by excellent quality animal protein, overcoming the major poultry supplier countries worldwide. This involves research and lineages development, genetics, nutrition, rearing systems, among others, that provide the supply of products with stable quality standards, that ensure the safety and consumer satisfaction. The poultry production in organic system in Brazil meets Instruction n^o7, the

Ministry of Agriculture (MAPA), where birds are raised in the pasture area with low density and feed containing certified organic plant ingredients and must not receive chemotherapeutic products. It also regulates the colonial or free-range system that defines management conditions of this kind of bird, where from 28 days of age birds must have access to paddocks and with a minimum of three square meters available for each bird housed [2]. To meet the market of poultry meat quality depends on factors such as cooling rate and temperature. These factors are considered as criteria for good acceptance of items: appearance, water holding capacity, juiciness, tenderness, skin color, meat color, cooking weight loss and lifetime [3]. The objective of this study was to compare the qualitative characteristics of *pectoralis major* (chest) muscle of broilers from the organic and colonial or free-range system.

II. MATERIALS AND METHODS

In a commercial scale butcher shop in the southeastern Brazil, 100 broiler carcasses were collected. Fifty carcasses of Cobb broilers reared under organic system, with slaughter age of 45 days. These birds were fed diets with certified organic ingredients (corn and soybean meal), without animal ingredients and without antibiotics. The other fifty carcasses from birds raised under colonial or free-range system, Red Neck Label Rouge lineage, with slaughter age of 85 days. In both systems, birds were reared in semi-confined system, remaining in sheds until 25 days of age to be heated and protected and then, they had access to a pasture area. After collection, carcasses were sent to the Laboratory of Technology of Animal Products Department of Technology of São Paulo State University, maintaining the cold chain, for

meat qualitative tests. Color characteristics, pH and water activity (A_w) in *Pectoralis Major* muscle (chest) were evaluated. Color was determined using the Minolta colorimeter Chrome Meter model CR-300, which uses the CIELAB system (L^* , a^* and b^*) assessing the lightness (L^*), redness (a^*) and yellowness (b^*). The pH was checked using the digital pH meter equipped with direct insertion electrodes penetrating into the muscle and water activity (A_w) measured on samples placed in a suitable container of "Aqualab" analyzer device which uses the dewpoint principle, methodology approved by AOAC [1]. This study used a randomized design (organic and colonial or free-range system) with 50 repetitions each, and the results were submitted to analysis of variance using the GLM Procedure of SAS operating system [6] and means were compared by Tukey test at 5% significance.

III. RESULTS AND DISCUSSION

The results obtained for lightness (L^*), redness (a^*) and yellowness (b^*), pH and water activity (A_w) of the breast meat of broiler reared under organic and colonial or free-range system are shown in Table 1.

Table 1 Mean values for lightness (L^*), redness (a^*) and yellowness (b^*), pH and water activity (A_w) of breast meat from organic and colonial or free-range system broilers

	L^*	a^*	b^*	pH	A_w
Organic	52,04	4,09A	2,31	5,86A	0,965
Free-Range	52,67	1,48B	2,86	5,74B	0,965
F Test	0,56 NS	51,11 **	0,99 NS	7,44 *	6,70 NS
CV (%)	3,59	19,28	16,96	1,66	0,94

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. *($P < 0.05$); **($P < 0.01$).

There was no difference in breast meat from birds to the variable lightness (L^*), yellowness (b^*) and water activity (A_w) between rearing systems studied. The redness (a^*) was significant for all treatments. Breast meat from birds reared under organic system (Cobb) had higher values for a^* . These data do not corroborate [5], when worked with Cobb, Pedrês Paraiso and ISA Label and observed no effect on the L^* and b^* color parameters from breast meat. For the same cut,

these authors also found that free-range birds had higher levels for a^* (3.64 for Pedrês Paraiso birds and 3.25 for Isa Label) than Cobb birds (2.66). Regarding pH, higher values were observed in organic broiler carcasses. Studies evaluating the effect of organic system on carcasses and meat quality of broilers [4], lower values were found for pH (5.75) compared to this study and the author also mentions that organic carcasses showed lower pH values compared to conventional system birds. Water activity is one of the intrinsic factors of the food and a qualitative measure that allows the availability of free water, i.e. water available for chemical, physical and biological reactions and used by microorganisms that can spoil the food. In this study, no difference for this characteristic were found between broilers reared in different systems.

IV. CONCLUSION

The rearing systems used influenced the qualitative characteristics of redness (a^*) and pH from *Pectoralis major* muscle meat of broilers.

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