Effect of slaughter age and sexual maturity on meat quality of chickens raised in a free-range system

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Objectives: The objective of this study was to evaluate the meat quality of Label Rouge chickens raised a free-range system as a function of age at slaughter and sexual maturity. In recent years, there has been an increasing demand for free-range chickens, which have become a promising market product in the poultry industry because of the lack of use of growth promotors and welfare aspects adopted in husbandry. Brazil, despite being one of the most important producers and exported poultry meat in the word, does not have an official database about chicken raising in free-range systems and probably represents less than 1%. In Brazil, a "free-range chicken production system" denotes a meat production system that allows birds slow growth and access to pasture, in addition to restricting the use of any growth promoters, and the animals are slaughtered between 70 and 120 days of age. Because of this, some studies have shown that these chickens slaughtered at lower ages had similar meat quality characteristics to those of conventional chickens. We believe that the main reason for this could be associated with the fact that these birds are slaughtered before reaching sexual maturity. Therefore, slaughtering birds after sexual maturity or at higher ages could be a strategy to improve meat quality in free-range systems.

Materials and Methods: In the present experiment, ninety birds (45 females and 45 males) belonging to the Label Rouge (*Pescoço Pelado*) strain were used. For the analysis of meat quality parameters, the individual effects of slaughter age, sexual maturity and sex were considered through a completely randomized design (CRD) with a factorial scheme of 2 x 2 (two categories of sexual ma- turity (immature and mature) and two sexes (male and female)) and a 5 x 2 arrangement (with slaughtering at five ages (70, 90, 120, 150, and 180 days) and two sexes (male and female)). For evaluation, samples from breast and drumstick were used, and for meat quality parameters, the physicochemical (final pH - 24 h, color according to CIE L*a*b* system, cooking loss, shear force) and centesimal composition analyses (protein, moisture, ash and ether extract) were considered. The statistical analyses of the data were analyzed by SAS® software.

Results and Discussion: In both cuts, the final pH did not differ according to sexual maturity. However, there was an influence of slaughter age on the tendency to increase the pH in breasts according to the age of birds, and higher values were found at 150 days of age in drumsticks. In breast and drumstick cuts, sexual maturity promoted an increase in redness (a*) and shear force and a de- crease in hue angle (h^o); in breast meat, the color changed from yellow to orange, while in drumstick cuts, it remained the same. Considering color parameters, there were also increases in a* and shear force in both cuts and sexes according to age at slaughter, and they show that the process of aging in birds is responsible for these results. In breast meat, despite not having a difference in lightness (L*) according to sexual maturity, males showed higher values when they were slaughtered at 90 and 120 days, and b* was lower in breasts from males slaughtered at 90 days, while in females, there was no influence of age. In the drumstick, lower values for L* were found in both sexes for birds slaughtered at 120 and 180 days, and b* in males tended to decrease with increas- ing slaughter age. Otherwise, females showed higher values of b* at 180 days and lower values at 90 days. Cooking loss was influ- enced by slaughter age and sex, and the results were variable. The centesimal composition in both cuts did not influence sexual maturity, slaughter age or sex for protein. However, in breast meat according to slaughter age, there was an increase in protein and ash and a decrease in moisture. Sexual mature birds showed higher values of ash and lower values for moisture in drumstick meat. In both cuts for extract ether, mature females showed higher values. On the other hand, in both cuts, the ether extract in males was not influenced by slaughter age, and in breast meat, females showed an increase. In general, consumers look in products from chicken raising in free-range system characteristics, such as increasing firmness, color intensification and an adequate quantity of fat. Thus, chickens slaughtered after sexual maturity or 120 days have increasing characteristics appreciated by consumers and could be an important aspect being considered in the production of this system.

Key words: Shear force, Label rouge, Color, Centesimal, Physicochemical