

Lipid profile of meat from different free-range chicken strains

Peter Faria¹, Xisto Rodrigues de Souza², Rozilaine Aparecida Pelegrine Gomes de Faria², Edgar Nascimento², Demetrio de Abreu Sousa², Maria Cristina Bressan³

¹ Federal University of Lavras (UFLA), Department of Veterinary Medicine, Lavras, MG, Brazil, ² Federal Institute of Education, Science and Technology of Mato Grosso (IFMT), Bela Vista Campus, Cuiabá, MT, Brazil, ³ Universidade Lusófona de Humanidades e Tecnologias, Campo Grande, Lisboa, Portugal

Objective: To study the effects of the reduction of precocity of the strains adapted to the free-range system on the meat quality, the lipid composition of the thigh and breast cuts of chickens raised in a free-range system was evaluated. The strains adapted to the free-range system acquire characteristics appropriate to the market at different ages. It is already known that the formation of the characteristic flavor of the freerange chicken is related to sexual maturity, so the precocity in development can also interfere with the lipid quality of the meat from chickens raised in the free-range system.

Materials and Methods: Two slow-growing strains (Red Naked Neck - Rnn and Carijó - Cj) and two early-growing strains (Super-heavy - Sh, Paraíso Pedrês - Pp) of both sexes were studied and slaughtered at 85 days of age. Skinfree samples of the thigh and breast cuts were extracted to determine the lipid composition. Lipid extractions were performed by cold extraction and esterification. The fatty acids were identified by the retention time in the column compared to chromatographic standard (PUFA 2, Sigma Aldrich). The quantification of the fatty acids was performed by converting the peak areas into percentages in the samples.

Results and Discussion: The total lipid data presented effects of genetic groups, with the Sh and Pp strains presenting values for thigh (2.91 and 2.84%), and breast (1.03 and 1.04%), higher than the values verified in the Rnn and Cj strains (thigh, 2.42 and 2.43%, and breast, 0.69 and 0.70%, respectively). Data from the linoleic acid (C18:2 ω 6) showed the effects of a genetic group on the thigh, where the Pp strain had a lower linoleic acid content (16.24%) than the Rnn, Sh and Cj strains (16.80, 16.88 and 17.87%, respectively). The linolenic acid (C18:3 ω 3) showed difference between the sexes, with values of 0.47 and 0.43% for males and females, respectively. On the other hand, there was a genetic group effect on the thigh, when the Pp strain presented lower content of C18:3 ω 3 (0.37%) than the Rnn, Sh and Cj strains (0.49, 0.46 and 0.48%, respectively). Arachidonic acid (C20:4 ω 6) showed no sex effect on either cuts, however, the Rnn and Cj strains showed higher contents (thigh, 4.00 and 4.37%, and breast, 6.26 and 6.52%) than Pp and Sh strains (thigh, 3.50 and 2.99%, and breast, 4.20 and 4.56%, respectively). The EPA acid (C20:5 ω 3) did not suffer the effect of genetic group or sex and ranged from 0.05 to 0.22% in the thigh, and between 0.08 to 0.14% in the breast. Vpp and Cj strains showed for DHA acid (C22:6 ω 3) a higher content in thigh (0.26 and 0.32%) and breast cuts (0.64 and 0.60%) than Sh and Pp strains (thigh, 0.23 and 0.21%, and breast, 0.33%). The sum of saturated fatty acids (SFA), C14:0, C16:0 and C18:0 acids, ranging between 29.31 to 42.13%, and they did not suffer strain or sex effects. The sum of monounsaturated fatty acids (MUFA), C16:1 ω 7, C18:1 ω 9 and C20:1 ω 9 acids did not present a difference between sexes or strains in the thigh. But in the breast, the effect of genetic groups were verified, with the strains Rnn and Cj presenting lower contents (36.40 and 36.86%) in relation to the Sh and Pp strains, with 41.55 and 42.23% of MUFA. The sum of polyunsaturated fatty acids (PUFA), C18:2 ω 6, C18:3 ω 6, C18:3 ω 3, C:20:4 ω 6, C20:5 ω 3; C22:4 ω 6; and C22:6 ω 3, did not present a sex effect. However, a strain effect was found, when the Pp and Sp strains showed lower values (thigh, 20.68 and 21.86%, and breast, 22.07 and 21.83%) than the Pp and Cj strains (thigh, 22.48 and 23.95%, and, breast, 25.27 and 25.34%, respectively). The sum of ω 6 polyunsaturated fatty acids (ω 6 PUFA), C18:2 ω 6, C18:3 ω 3, C:20:4 ω 6, C22:4 ω 6 showed results similar to the PUFA, with slow-growing strains presenting higher contents in relation to early-growing strains. Sum of ω 3 polyunsaturated fatty acids (ω 3 PUFA), C18:3 ω 3, C20:5 ω 3, and C22:6 ω 3 content there was no influence by strain or sex factors. The analysis of the cholesterol in the thigh showed no effect of sex, but the effect of genetic group was verified, with the strain Rnn presenting a higher content (92.63 mg/100 g of meat) than the Sh, Pp and Cj strains (88.18, 90.82 and 90.49 mg/100 g of meat, respectively), while no sex or genetic group effects were observed in the breast, with contents ranging between 54.90 and 57.66 mg/100 g of meat.

Conclusions: Considering the conditions of this experiment, MUFA represent the largest component, exceeding 42% of the total fatty acids in the samples; the content of SFA is not affected by strain or sex; the early growth strains (Sp and Pp) have higher total lipid and MUFA content, and slow-growing strains (Rnn and Cj) have higher PUFA content.

Key words: Fatty acids, Cholesterol, Sexes, Label Rouge, Meat