

linolenic and eicosapentaenoic acids, regardless of the finishing phase. The same results were observed in the LF group for arachidonic acid. In general, the LP and HP groups finished on pasture resulted in healthy beefs, with the greatest CLA and omega-3 concentrations.

Key Words: finishing system, growth out, lipid composition

doi:10.2527/asasann.2017.365

366 Gender status effects on beef fatty acid profile of Angus × Nellore cattle. L. F. Mueller¹,

J. C. D. C. Balieiro², A. M. Ferrinho³, J. D. J. M. Furlan⁴, M. L. N. Furlan², M. Zanata², T. R. Amorin², I. H. S. Fuzikawa², T. S. Martins², F. Baldi⁵, and A. S. C. Pereira², ¹University of Sao Paulo (USP), School of Animal Science and Food Engineering (FZEA), Department of Animal Science (ZAZ), Pirassununga, Brazil, ²Universidade de São Paulo, Pirassununga, Brazil, ³School of Animal Science and Food Engineering, University of São Paulo, Pirassununga, Brazil, ⁴University of Sao Paulo (USP), School of Veterinary Medicine and Animal Science (FMVZ), Department of Animal Science (VNP), Pirassununga, Brazil, ⁵School of Agricultural and Veterinarian Sciences, Sao Paulo State University— FCAV/UNESP, Jaboticabal, Brazil.

Beef fatty acid profile can be modified by the sex of the animals. Therefore, the goal of this study was to evaluate the influence of gender status on beef fatty acid profile of feedlot Angus × Nellore cattle. A total of 176 cattle, 20 wk of age, from the Brazilian Certified Angus Beef Program were assigned to 4 sex classes: 32 bulls, 48 steers, 48 immunocastrates, and 48 heifers, presenting initial mean weights of 251.4 ± 3.62 kg for bulls, 266.6 ± 2.95 kg for immunocastrates, 226.4 ± 2.95 kg for steers, and 255.4 ± 2.95 kg for heifers. Cattle were fed during 190 d an ad libitum high-grain diet containing 80% concentrate. At the end of the experimental period, cattle were slaughtered. Steaks were collected from the LM and stored at -80°C pending analysis for fatty acid profile. Beef fatty acid was extracted and then the methyl esters were formed. Fatty acids were quantified using a gas chromatography. Statistical analyzes were performed using PROC MIXED of SAS, including the fixed effect of gender status and the random effect of cattle within gender groups. The gender status had no effect on the total SFA, but significant differences were observed for MUFA, PUFA, CLA, *n*-6, the *n*-6:*n*-3 ratio, and the PUFA:SFA ratio ($P < 0.05$). Beef from heifers had greater levels of MUFA (45.77%; $P < 0.01$) and CLA (0.42%; $P = 0.0006$) when compared with bulls (41.56 and 0.30%, respectively), steers (44.21 and 0.30%, respectively), and immunocastrates (43.95 and 0.36%, respectively). The highest levels of MUFA in the heifers' beef was mainly related to the higher levels of the major single fatty acids in this group, namely C18:1 *n*-9

(35.65%; $P < 0.01$) and C16:1 *n*-9 (2.94%; $P < 0.01$). On the other hand, the levels of PUFA and *n*-6 and the PUFA:SFA and *n*-6:*n*-3 ratios were greater ($P < 0.01$) in beef from bulls (9.76, 8.36, 0.22, and 4.83%, respectively) compared with the other gender statuses. In conclusion, beef from heifers can be considered healthier to humans because it presented lower levels of *n*-6 and myristic acid and higher levels of CLA, MUFA, and oleic acid.

Key Words: beef cattle, fatty acid composition, sexual condition

doi:10.2527/asasann.2017.366

367 Chemical treatment of poultry litter does not affect the chicken meat quality. J. D. J. M. Furlan¹, L. F. Mueller², A. M. Ferrinho³, M. L. N. Furlan⁴, M. Zanata⁴, M. C. Izeppi⁴, T. R. Amorin⁴, I. H. S. Fuzikawa⁴, T. S. Martins⁴, F. Baldi⁵, and A. S. C. Pereira⁴, ¹University of Sao Paulo (USP), School of Veterinary Medicine and Animal Science (FMVZ), Department of Animal Science (VNP), Pirassununga, Brazil, ²University of Sao Paulo (USP), School of Animal Science and Food Engineering (FZEA), Department of Animal Science (ZAZ), Pirassununga, Brazil, ³School of Animal Science and Food Engineering, University of São Paulo, Pirassununga, Brazil, ⁴Universidade de São Paulo, Pirassununga, Brazil, ⁵School of Agricultural and Veterinarian Sciences, Sao Paulo State University – FCAV/UNESP, Jaboticabal, Brazil.

Many studies have demonstrated the damaging effect of gases such as ammonia in the production of broilers chickens, especially on the performance and blood parameters. However, few studies have evaluated the effect of using additives to treat poultry litter on the chicken meat quality. Therefore, the goal of this study was to evaluate the effects of aluminum sulfate doses ($\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$; 0, 200, 400, and 600 g/m²) to treat poultry litter and stocking density (12 and 14 birds/m²) on chicken meat quality traits. A total of 532 broiler male Cobb 500 chicks presenting an initial mean weight of 46 g \pm 2.3 were used and housed in a completely randomized experimental design, with 4 \times 2 factorial arrangement, totaling 8 treatments with 7 replicates each. Standard industry diets were used throughout the study, including starter (0 to 21 d), grower (21 to 35 d), and finisher (35 to 42 d) diets. At the end of the experimental period (42 d), 2 birds per replicate were randomly chosen and harvested. The traits analyzed in chicken meat were pH (24 h postmortem), color (*L**, *a**, and *b**), cooking loss, and shear force. Statistical analyses were performed using PROC MIXED of SAS, including the fixed effect of factors (aluminum sulfate and stocking density) and interactions. No interaction was detected between treatments for any meat quality trait evaluated ($P > 0.05$). The treatments with a highest sulfate levels and density presented the lowest

cooking loss (28.80%). There was a curvilinear response (cubic) of aluminum sulfate doses for meat color on the a^* value ($P = 0.0214$), with the addition of aluminum sulfate (0 to 200 g/m²) decreasing the a^* value. However, the a^* values increased when the doses of aluminum sulfate were 400 and 600 g/m². In conclusion, the addition of aluminum sulfate ($Al_2(SO_4)_3 \cdot 18H_2O$) and stocking densities evaluated did not affect chicken meat quality.

Key Words: aluminum sulfate, broiler, litter
doi:10.2527/asasann.2017.367

368 Effects of functional oils and vitamin E addition on meat sensory traits from feedlot lambs.

M. L. N. Furlan¹, L. F. Mueller², A. M. Ferrinho^{*1}, J. D. J. M. Furlan³, M. Zanata¹, I. H. S. Fuzikawa¹, T. R. Amorin¹, T. S. Martins¹, S. B. Gallo⁴, and A. S. C. Pereira¹, ¹Universidade de São Paulo, Pirassununga, Brazil, ²University of São Paulo (USP), School of Animal Science and Food Engineering (FZEA), Department of Animal Science (ZAZ), Pirassununga, Brazil, ³University of São Paulo (USP), School of Veterinary Medicine and Animal Science (FMVZ), Department of Animal Science (VNP), Pirassununga, Brazil, ⁴School of Animal Science and Food Engineering, University of São Paulo, Pirassununga, Brazil.

The use of functional oils replacing additives, such as antibiotics, ionophores, and growth promoters, has shown good results. Furthermore, there is an increasing demand from consumers for healthier meat. Therefore, the aim of this study was to evaluate the effects of the inclusion of functional oils (*Ricinus communis* and *Anacardium occidentale*) and vitamin E in high-grain diets on meat sensory traits of lambs. A total of 30 crossbred lambs (12 males and 18 females), 5 mo of age, were used. Lambs presenting initial mean weights of 26 ± 3.6 kg for females and 28 ± 3.6 kg for males were grouped into a randomized block design, confined, and assigned to the following treatments, with 10 replicates each: no additives inclusion (CON), inclusion of functional oils (500 mg/kg DM; OIL), and inclusion of functional oils (500 mg/kg DM) + vitamin E (500 IU vitamin E/kg DM; OILVIT). Animals were fed ad libitum with a high-grain diet containing 85% concentrate. At the end of the experimental period (77 d), the animals were harvested with final mean weights of 38.59 ± 4.15 kg (females) and 47.11 ± 4.24 kg (males). Vacuum-packaged steaks (2.54-cm thick) from the LM were collected and stored at -18°C pending analysis for sensory traits. An acceptance test was used, in which 100 untrained laboratory consumer panelists evaluated 1 sample from each treatment class. Each panelist evaluated the samples using an evaluation form including a 9-point hedonic scale, where 1 = dislike extremely and 9 = like extremely, for sensory attributes such as aroma, flavor, tenderness, and juiciness and a scale from 1 to 5, where

1 = very strong and 5 = absent, for off-flavor and off-aroma. Statistical analyses were performed using PROC MIXED of SAS (version 9.2). No difference was found between treatments for aroma, off-flavor, and off-aroma ($P > 0.05$). The best scores were observed in OILVIT for the tenderness and juiciness attributes when compared with the other treatments ($P < 0.05$). For the flavor attribute, the best scores were observed in OILVIT and CON when compared with the OIL treatment ($P < 0.05$). The inclusion of functional oils and vitamin E in the sheep diets appears to be a good option to improve lamb sensorial traits.

Key Words: additive, sensory analysis, sheep
doi:10.2527/asasann.2017.368

369 Performance and carcass quality of Nelore cattle evaluated during termination phase in integrated agricultural production systems.

P. A. C. Luz^{*1}, C. Andrighetto², G. C. Lupatini³, H. S. Aranha³, A. S. Aranha⁴, E. A. R. D. Santana⁴, J. A. M. D. Almeida³, R. F. Vaz³, and A. M. Jorge¹, ¹Universidade Estadual Paulista – FMVZ, Botucatu, Brazil, ²Universidade Estadual Paulista – UNESP, Dracena, Brazil, ³São Paulo State University (UNESP), Dracena, Brazil, ⁴São Paulo State University (UNESP), Botucatu, Brazil.

Integrated agricultural production systems have been gaining prominence in recent years, especially those that advocate the use of trees, which, in addition to being an alternative income per unit area, protect animals against extreme weather conditions that can influence animal performance and, consequently, carcass characteristics. Therefore, the present study was developed with the aim of evaluating the animal performance and carcass characteristics of Nelore cattle during the termination phase in integrated agricultural production systems without shade availability (ICL) and with 2 densities of trees (ICLF-1L and ICLF-3L). The experimental design was performed in nonrandomized complete blocks with 3 treatments—integrated crop–livestock (ICL); integrated crop–livestock–forest, with eucalyptus trees planted in simple lines (196 trees/ha; ICLF-1L); and integrated crop–livestock–forest, with eucalyptus trees planted in triple lines (448 trees/ha; ICLF-3L)—and 4 replicates per treatment, totaling 12 experimental plots. A total of 60 castrated Nelore cattle were used, weighing 382.51 ± 27.17 kg, with an age of 28.0 ± 2.81 wk, and 453.68 ± 29.69 kg, with an age of 34.0 ± 2.81 wk, at the start and end of the termination phase, respectively. The variables evaluated were ADG; final live weight; warm carcass weight; carcass yield; weight and yield of the forequarter, special hindquarter, and flank; rib eye area; back fat thickness; and marbling. All data was initially tested for normality with the Shapiro–Wilk test from the UNIVARIATE procedure. Also, it was normally distributed ($W \geq 0.90$). The analysis was developed by using the Student's t test, at the significance level of 5%, as well as

Reproduced with permission of copyright owner.
Further reproduction prohibited without permission.