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Linear models applied to the study of Texel carcass components based on slaughterhouse classifications from Uruguay

Rafaela Longo[1*], Laila Talarico Dias[1], Gabriel Ciappesoni[2]

[1] Department of Animal Science and Graduate Program in Animal Science, Universidade Federal do Paraná (UFPR), Curitiba, PR, Brazil
[2] National Institute of Agricultural Research (INIA), Las Brujas, Canelones, Uruguay

[*]Correspondence: rafaelalongo@ufpr.br

The evaluation of sheep carcasses is carried out by specialized labor, combines objective and subjective measures, and establishes carcass quality standards. In general, the classification does not consider the potential use of the carcass, especially for valuable cuts. So, the aim of this study was to evaluate the conformation (C) and final (F) classifications of sheep carcasses as predictors of the sum of the weight (g) of the shoulder (SH), French rack (FR) and boneless leg (LEG) cuts (Y) compared to the hot carcass weight (HCW) in Texel. Data from 562 Texel lambs, born between 2008 and 2015, in 2019 and in 2021, granted by the National Institute of Agricultural Research (INIA) of Uruguay, were analyzed. Three linear models were used, as follows: Model One ($Y_{ijk} = \mu + YEAR_i + C*F_j + AGE_k + \varepsilon_{ijk}$), Model Two ($Y_{ijkl} = \mu + YEAR_i + C*F_j + AGE_k + HCW_l + \varepsilon_{ijkl}$), and Model Three ($Y_{ikl} = \mu + YEAR_i + AGE_k + HCW_l + \varepsilon_{ikl}$), where: Y = sum of the weight of SH, FR and LEG cuts; μ = mean Y of the population; $YEAR_i$ =l inear fixed effect from the i^{th} year at slaughter; $C*F_j$ = effect of the interaction between C (supreme, prime, median and lower) and A (4-excess, 3-abundant, 2-moderate and 1-scarce); AGE_k = linear effect of the covariate age at slaughter, in days; HCW_l = linear effect of the covariate HCW; ε = random error associated with each observation. The analyses were performed using the PROC GLM procedure of SAS (Statistical Analysis System, Version 9.4) software. Regardless of the model used, the effect of age at slaughter was not statistically significant ($p > 0.05$). The Y estimates obtained with Model One ($R^2 = 0.81$) allowed the categorization of the results for supreme and prime carcasses for a final scale greater than 1 ($p < 0.0001$). Models Two and Three had higher R^2 (0.94), thus these models explaining more precisely the variation in the data and presenting lower error for the estimatives ($p < 0.0001$). This result indicated that when the HCW was used as a covariable, the prediction was greater. Furthermore, although Model One identified the heaviest carcasses, it did not identify the highest weight of the noble cuts. The HCW could be a good criterion to identify carcasses with greater profitability potential, since specialized labor is not required to get it, therefore the cost is lower. It is possible to concluded that, for animals of homogeneous biotypes, HCW is a good predictor of the weight of the cuts: shoulder, French rack and boneless leg in carcasses of Texel lambs raised in Uruguay.

Keywords: Slaughterhouse classification. Lamb cuts. Beef sheep.