Effect of family and birth type on carcass traits in Santa Ines breed

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Family is a random effect few studied in animal science, except for animal breeding purpose. However, this can be a serious mistake, because the F-test in analysis of variance (ANOVA) depends on residual variance, which may be poorly estimated if family effect is important, but no inserted in the statistical model. Thus, this study aimed to test family effect on meat traits post-mortem. Longissimus muscle area, fat thickness, tenderness by shear force, losses water by cooking, pH at slaughter, pH 24 hours post-mortem, L*, a*, b*, croma and *H were measured in 102 lambs. The statistical model included the fixed effects of birth type (one or two lambs per birth), the covariates animal's age and dam's weight at weaning, and the random effect of family (sire nested dam). The family effect was significant only for pH at slaughter ($p<0,05$). However, the coefficient of determination in ANOVA was larger than 0.80 when family effect was inserted in the model and less than 0.30 in other case. It is possible that the some type II Error had occurred in this study, because for some traits de coefficient of variation in ANOVA was high. For example, for Longissimus muscle area (36.7%), fat thickness (20.7%), tenderness by shear-force (31.1%), b* (22.8%), were high, for a* (12,5%), croma (13,7%), and H* (13,1%) were intermediate, while for pH at slaughter and at 24 hours post-mortem the coefficient of variation were 1.44% and 3.44%. The birth type was significant only for pH at slaughter and at 24 post-mortem ($p<0.05$), being at slaughter 6.48 and 6.77 for simple and double births, respectively. While the pH at 24 hours post-mortem were 5.25 and 5.69 in simple and double births, respectively. Again, some error type II may be occurred, because large coefficient of variation. For example, Longissimus muscle area in lambs from simple birth was 9.77 cm^2, while in lambs from double birth was 8.36 cm^2. It is possible that 1.41 cm^2 to be a significant difference, but due to the large coefficient of variation of this trait, does not possible to detect significant F-test in ANOVA. Thus, birth type may be significant for some traits, but new studies are need. Finally, the flock studied here has large residual variance percentage for some carcass traits explained by the sires and dams, but the large variation in those traits makes difficult its analysis. Anyway, this source of variation is not fit in several studies in animal science and the consequences are biased estimates of residual variance in ANOVA, which may leads to errors in the F-test. Furthmore, the least square means and effects may be biased too.

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