THE RELATIONSHIP OF PORK CARCASS WEIGHT, LEANNESS PARAMETERS, AND IODINE VALUE IN THE ONTARIO COMMERCIAL PORK INDUSTRY

Z. Zhou[1*] and B. M. Bohrer[1],

[1]*Food Science, University of Guelph, Guelph, Canada*,

*bbohrer@uoguelph.ca

I. OBJECTIVES

This study examined the relationships of pork carcass parameters with carcass weight and iodine value. It was hypothesized (1) that increased carcass weight would cause pork carcasses to become fatter and heavier muscled and to have lower iodine value and (2) that iodine value would decrease as pork carcasses become fatter.

II. MATERIALS AND METHODS

Data used in this study were obtained from 37,488 pork carcasses processed in a commercial facility in southwestern Ontario in November 2019. Fat depth, muscle depth, predicted lean yield, carcass weight, and iodine value (level of unsaturation for fat tissue) were evaluated. The dataset was analyzed using 2 unique approaches. Approach #1 analyzed the data for correlation with individual carcasses as the statistical units. Approach #2 separated the data into categories based on carcass weight or iodine value before the averages were analyzed for correlation. The categories for carcass weight were determined based on 10-kg increments ranging from very light (70.0–79.9 kg) to very heavy (130.0–139.9 kg). The categories for iodine value were defined as low (<70), medium low (70–75), medium high (75–80), and high (>80). Pearson correlation coefficients generated from SAS (SAS Institute Inc., Cary, NC) with PROC CORR were used for both statistical approaches.

III. RESULTS

Statistical analysis approach #1: A significant weak positive correlation was detected between fat depth and hot carcass weight ($r = 0.32$; $P < 0.001$), muscle depth and hot carcass weight ($r = 0.09$; $P < 0.001$), iodine value and hot carcass weight ($r = 0.03$; $P < 0.001$), muscle depth and iodine value ($r = 0.07$; $P < 0.001$), and predicted lean yield and iodine value ($r = 0.26$; $P < 0.001$). A significant weak negative correlation was detected between predicted lean and hot carcass weight ($r = -0.29$; $P < 0.001$) and fat depth and iodine value ($r = -0.26$; $P < 0.001$). Statistical analysis approach #2: Highly predictive regression equations were generated, which was summarized by strong correlations between fat depth and hot carcass weight ($r = 0.99$; $P < 0.05$), muscle depth and hot carcass weight ($r = 0.81$; $P < 0.05$), and predicted lean and hot carcass weight ($r = -0.99$; $P < 0.05$). The correlation between iodine value and hot carcass weight was moderate but not considered significant ($r = -0.52$; $P > 0.05$). Upon further investigation, iodine value reached a plateau of approximately 71 between the weight range of 80.0–129.9 kg. When carcasses were categorized by iodine value, significant correlation was detected between hot carcass weight and iodine value ($r = 0.97$; $P < 0.05$), fat depth and iodine value ($r = -0.99$; $P < 0.05$), muscle depth and iodine value ($r = 0.99$; $P < 0.05$), and predicted lean yield and iodine value ($r = 0.99$; $P < 0.05$).

IV. CONCLUSION

It was possible to conclude that categorical analysis provided stronger correlations when compared to uncategorized correlation analysis that used individual carcass as the statistical unit. This highlights the large variation attributed to individual carcass, or pig, in this commercial dataset. It was concluded that when carcasses were categorized based on weights into 10-kg increments, heavier carcasses were fatter and heavier muscled and had a lower predicted percentage lean. Additionally, when carcasses were categorized based on iodine value, carcasses with greater iodine value were heavier weight, less fat, and heavier muscled and had a greater predicted lean yield.

Keywords: carcass composition, iodine value, meat quality, pork