

ANIMAL SCIENCE

Title: Evaluation of lean content and trim of cull sows on their value at harvest (NPB #08-010)

Revised

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Scientific Abstract

A study was conducted to estimate the lean content from the four USDA grades of A study was conducted to estimate the lean content from the four USDA grades of cull sows, determine if standardized prediction equations for estimating cull sow lean content is possible and to estimate the type, weight and value of trim loss from cull sows at harvest. A total of 212 cull sows were processed at Old McDonald Meats, Ogden UT. Cull sows were obtained from area commercial pork producers. The genetic background of the sows consisted of commercially available maternal lines. Prior to harvest, ultrasonic backfat and loin muscle estimates were obtained and body weight was obtained from individual sows. On each harvest day, 6 to 10 sows were processed under USDA inspection. After the animal was rendered unconscious using electrical stunning procedures, each sow was exsanguinated and eviscerated. Any tissue that was required to be trimmed from the carcass due to abscesses, bruises, or any other reason, was weighed and its location recorded to evaluate trim losses. Following processing, each carcass was weighed, split down the spine using an electrical meat processing saw and chilled overnight at 20 F. The following day ½ of the carcass was weighed and divided into primal cuts including the loin, belly, ham, shoulder and ribs. If the two halves of the carcass were not equally split (carcass weight of the two halves within 5 lbs. or ~2.5 kg) the data were not used in subsequent analyses. The ribs were divided into knife separable bone, lean, fat and skin tissue components. Individual components were weighed and percentages of primal, carcass and live weight calculated. If the total primal weight and individual component weights were not equal, the data were not used in subsequent analyses. This information was used to determine the lean and fat percentage by primal cut within each USDA cull sow live-weight class. All data were adjusted to a mean carcass weight within each USDA weight classification to reduce the variation within each weight class due to carcass weight.

Differences among the lean, fat, skin and bone weight from sows in different market weight classes were observed in the current study. Similarly, the percent lean and fat by carcass and total body weight for each of the primal cuts by weight class were calculated. There were percent lean and percent fat differences when each primal was evaluated across USDA cull sow weight category. However, the percent lean and percent fat expected for market weight class (MWC) 1 and MWC 2 were not significantly different for each primal cut. The same was true for MWC 3 and MWC 4. In general, the two lighter market weight classes had a higher

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percent lean and lower percent fat than the two heavier weight classes. This information could be used by processors to better identify cull sows that are more likely to have appropriate lean to fat ratios either from individual primal or from entire carcasses in order to more closely meet the lean to fat ratios of food products they might manufacture (brats, sausage, etc.).

Analyses predicting carcass lean mass were developed within each USDA cull sow weight class and across classes (ignoring USDA class). Models utilized backfat and loin muscle area measured ultrasonically on live animals and manually on carcasses. It appeared that either the ultrasonic values or the carcass measures could be used to develop lean mass prediction equations for cull sows and arrive at similar endpoints. Hot carcass weight and backfat were the best two variables for predicting carcass lean content. Across USDA cull sow classes the resulting r-square value was 0.90. This means hot carcass weight and backfat explained 90% of the variation in lean mass. When lean mass prediction equations were developed within USDA cull sow weight classes, r-square values reached approximately 0.80, slightly lower than the models ignoring weight class. Loin muscle area only improved lean mass prediction in the lightest weight sows. The relatively large influence of hot carcass weight on the prediction of lean mass helps explain the similarity of equations that were derived regardless of whether ultrasonic or carcass measures of backfat and loin muscle area were used. Of the 212 sows in the data set, trim loss was only recorded for four sows. The records of trim loss occurred on separate collection dates. From this data, it would be difficult to predict trim loss or to associate trim loss with a certain cause. Further studies are necessary to find a relationship between trim loss and factors influencing cull sow trim losses.

In summary, hot carcass weight and 10th rib backfat measures resulted in a prediction equation that had an r-square greater than 0.90. Results indicated prediction equations should be developed across USDA cull sow weight categories, thus ignoring category. The lean and fat weights by primal within and across the USDA cull sow weight categories could be used by cull sow processors to identify primal and cull sow weight categories to develop processed pork products like brats, sausage and other products with defined lean:fat content. The trim loss from sows involved in this study was insufficient to draw any conclusions. Further studies should be conducted to identify both primary trim loss locations and causes from cull sows.