Published April 25, 2019

2018 Reciprocal Meat Conference – Meat and Poultry Quality and Composition- Measurement and Prediction

Meat and Muscle Biology™

The Effects of Belly Weight and Location within the Belly on Bacon Quality Characteristics, Proximate Composition, and Fatty Acid Profile

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Keywords: bacon, composition, pork, quality characteristics
Meat and Muscle Biology 2(2):50 **doi:10.221751/rmc2018.043**

Objectives

Pork production in the U.S. is progressing toward the slaughter of heavier hogs. This shift in production has altered the composition and size of pork bellies, thus affecting the quality and consumer acceptability of bacon. In this study, bacon quality attributes were evaluated across belly weight and location within the belly.

Materials and Methods

There were 129 bellies used, representing 4 weight categories (5.9 to 6.8, $n = 31$; 6.8 to 7.7, $n = 24$; 7.7 to 8.6, $n = 42$; 8.6+ kg, $n = 32$) currently used in the pork packing industry. Following selection, bellies were trimmed and green weights were recorded. Bellies were then pumped, smoked, chilled, pressed, sliced, and packaged from anterior to posterior. Three packages (0.45 kg) were selected from each belly to represent the blade, middle, and flank regions. Bacon packages ($n = 378$) were evaluated for package firmness and percentage of visible lean. Bacon slices from these packages were evaluated for uncooked and cooked proximate composition, fatty acid profile, and calculated iodine value (IV). Data were analyzed using PROC GLM (SAS Inst. Inc., Cary, NC) with belly weight and location within the belly as the main effects.

Results

Uncooked and cooked moisture percentage was greatest ($P < 0.05$) in bacon from the 5.9 to 6.8 kg bellies compared to all other groups. Cooked moisture percentage was lowest ($P < 0.05$) in bacon from the 8.6+ kg bellies compared to all other groups. Uncooked and cooked fat percentage was lowest ($P < 0.05$) in bacon from the 5.9 to 6.8 kg bellies compared to all other groups. Whereas, the 8.6+ kg bellies had the greatest ($P < 0.05$) percentage of fat for cooked bacon compared to all other groups. Composition changes that occurred during cooking indicated that the bacon from the 5.9 to 6.8 kg bellies had the greatest ($P < 0.05$) percentage of moisture loss and the lowest ($P < 0.05$) percentage of fat loss compared to all other groups. Total monounsaturated fatty acid (MUFA) percentage was lowest ($P < 0.05$) in uncooked bacon from the 7.7 to 8.6 kg bellies compared to all other groups. Total MUFA ($P = 0.46$) and total saturated fatty acid ($P = 0.52$) percentage did not differ for cooked bacon across the weight classes. Total polyunsaturated fatty acid (PUFA) percentage was greatest ($P < 0.05$) in the 5.9 to 6.8 kg bellies for uncooked bacon compared to all other groups. Total PUFA percentage was lowest ($P < 0.05$) in the 8.6+ kg bellies for both uncooked and cooked bacon compared to all other groups. The IV for uncooked bacon were greatest ($P < 0.05$) in the 5.9 to 6.8 kg bellies compared to all other groups. Packages from the 5.9 to 6.8 kg bellies were the softest ($P < 0.05$), while packages from the 8.6+ kg bellies were the firmest ($P < 0.05$), compared to all other groups. Packages from the flank region had the lowest ($P < 0.05$) package firmness scores and the highest ($P < 0.05$) percentage of visible lean, compared to the middle and blade region. Packages from the 5.9 to 6.8 kg bellies had the greatest ($P < 0.05$) percentage of visible lean compared to all other groups.

Conclusion

Overall, the 5.9 to 6.8 kg bellies optimized quality traits by having the greatest moisture content, lowest fat content, and greatest percentage of visible lean. The heavier bellies tended to have higher lipid content which is linked with negative consumer perception. Therefore, by increasing the slaughter weight of hogs, consumer acceptance of bacon appearance could be adversely impacted.

