

PORK QUALITY

Title: Evaluating rapid evaporative ionization mass spectrometry (REIMS) as a real-time method for classifying pork quality in bacon and fresh pork bellies –
NPB #19-180

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Scientific Abstract:

Pork belly firmness, slice yield, smoke yield, and bacon cooking performance are all major considerations for overall belly quality, and, to date, there is no technology that exists to objectively measure these things simultaneously. Lab-based tests used to measure some of these belly characteristics are laborious, destructive, and take a considerable amount of time to complete. Rapid evaporative ionization mass spectrometry (REIMS) is a novel, *in-situ* analysis technology that measures the metabolomic profile in real time. The objective of this study was to evaluate REIMS as a real-time predictor of pork belly quality and fat composition to subsequently send market signals and value hogs based on objective measurements and ultimately improve the composition and quality of pork products. Pork bellies (N=391) from pigs fed 3 diets with varying levels of predicted iodine value (IVP) were analyzed for bacon yield, fat shattering, slice distortion, cook loss, fatty acid composition, iodine value, and REIMS. The 3 diets altered bacon yield, fatty acid composition and calculated IV of pork bellies, ultimately creating a diverse population for the evaluation of the metabolomic profile as acquired by REIMS. Canonical correlations of fatty acids and REIMS mass bins were used to create a model, and scores derived from REIMS mass bins were used to categorize individual samples into “Excellent”, “Great”, “Good”, and “Poor” quality groups. Those groups exhibited differences in proportion of #1 slices and #2 slices ($P<0.01$), shatter score ($P<0.01$), and degree of saturation as described by the proportion of saturated fatty acids (SFA; $P<0.01$), monounsaturated fatty acids (MUFA; $P<0.01$), and polyunsaturated fatty acids (PUFA; $P<0.01$) as well as calculated iodine value (IV; $P<0.01$). More notably, the model trained from the metabolomic profile was able to categorize a test set of data into the same quality groups with an overall accuracy of 70% and only 1 individual being misclassified by greater than 1 quality group difference (0.003%). These data suggest the ability of REIMS to improve the composition and quality of pork products by sending market signals based on objective measurements of product quality and composition resulting from feeding practices and genetics.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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