RESEARCH ABSTRACT
PORK QUALITY

Title: Influence of iodine value and packaging type on shelf life of HRI packaged bacon slices – **NPB# 13-127**

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Scientific Abstract:

Pork carcasses were selected for iodine value (IV) using a NitFom™ sensor. Carcasses were sorted into three IV categories with the target IV range defined as 58-63 (Low), 68-73 (Intermediate), and 78-83 (High). Over the course of three sampling dates, 72 pork carcasses were identified. Bellies were removed from both the right and left sides of the carcass so that there was a total of 144 bellies in study with 48 bellies (24 carcasses) in each IV category. Bellies were processed via commercial methods into bacon. This experiment was organized into a generalized randomized complete block design with a split plot that had three IV treatments with an average carcass IV of 64.9 (Low), 70.5 (Intermediate), and 76.5 (High) and two packaging treatments (aerobic and anaerobic). Fresh bellies were analyzed for dimensional characteristics (weight, length, width, thickness) and belly firmness. Left and right bellies were randomly assigned to packaging treatment. Each individual sliced belly was divided into five zones and one slice taken from each zone was laid out on divider sheets to represent the whole belly. Ten sheets were laid out for each belly representing the ten pull dates (d 0, 28 56, 70, 84, 98, 112, 126, 140, and 154) for oxidation analysis. Slices were selected from zone two for histological and collagen analysis. Bacon slices were analyzed for oxidative rancidity and fat color (L*a*b*) for every shelf life pull date. After packaging, bacon slices were stored at -17.8 ºC for the remainder of the storage period. Day 0 bacon was analyzed for fatty acid composition, pH, and proximate composition. Bacon manufactured from the High IV category carcasses had a higher ($P < 0.05$) analyzed IV compared to the Intermediate or Low IV category with mean IV values of 76.9, 70.9, and 67.7 respectively. Belly weight, length, width, and thickness were not different ($P > 0.05$) between IV categories. Belly firmness significantly ($P < 0.05$) decreased as the IV category increased. Bacon slices were not different ($P > 0.05$) in proximate composition (fat, moisture, and protein) or pH. High IV bacon samples had greater ($P < 0.05$) percentages of linoleic acid, linolenic, and total polyunsaturated fatty acids and lower ($P < 0.05$) percentages of myristic, palmitic, stearic and total saturated fatty acids compared with the Low IV category. Aerobic and anaerobically packaged bacon from the High IV group had lower ($P<0.05$) L* compared with Low IV group. Aerobically packaged bacon had lower ($P<0.05$) a* values from day 0 to day 154. Anaerobically packaged bacon had higher ($P < 0.05$) a* values from day 0 to day 154. Increasing storage time from day 0 to day 154 increased ($P < 0.05$) b* values for both aerobic and anaerobic packaging treatments. Thiobarbituric acid reactive substances did not differ ($P > 0.05$) between IV categories. Aerobically packaged bacon had higher ($P < 0.05$) TBARS from day 0 compared to day 28. TBARS values were also higher from day 28 to day 154 for aerobically packaged bacon. TBARS values for

anaerobically packaged bacon did not increase ($P>0.05$) from day 0 to day 84. Soluble collagen, insoluble collagen, and total collagen were higher ($P <0.05$) in the High IV category than the Low IV category. No differences ($P >0.05$) were detected in fat cell size or the number of fat cells in bacon fat between IV categories. In conclusion, IV category had minimal impact on frozen bacon quality. However, frozen bacon stored in aerobic packaging resulted in rapid development of lipid oxidation and more pronounced changes in fat color compared with bacon stored in anaerobic packaging.