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The Effect of Bacon Pump Retention Levels Following Thermal Processing on Bacon Slice Composition and Sensory Characteristics

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Objectives

The amount of curing solution permitted to be retained in bellies during bacon production varies from country to country. In the United States, according to 9 CFR 319.107, “the weight of cured pork bellies ready for slicing and labeling as “bacon” shall not exceed the weight of the fresh uncured pork bellies.” While in Canada, according to the Canadian Food Inspection Agency (CFIA), “side bacon, Wiltshire bacon, salt beef, and pork jowls are exempted from the minimum protein standard and the percent (%) meat protein label declaration.” Therefore, the objective of this study was to evaluate the effect of belly pump uptake and cook yield during thermal processing on bacon slice composition and sensory attributes.

Materials and Methods

Forty-four fresh pork rind-on bellies were sourced and obtained from a commercial pork processor. Each belly was skinned and cut into 2 halves at the medial point of the belly. Twenty-two of the paired belly halves were randomly assigned to experiment 1 and the remaining 22 paired belly halves were assigned to experiment 2. The 2 experiments addressed different cooking techniques used by bacon processors—bacon in experiment 1 was cooked to an internal meat temperature of approximately 55°C, and bacon in experiment 2 was cooked to an internal meat temperature of approximately 62°C. Belly halves were assigned to treatment within each experiment so that an equal number of anterior halves (blade ends) and posterior halves (flank ends) would be represented in each treatment. Treatment consisted of target levels of pump uptake. Belly halves targeted at a pump uptake of 15% were assigned to the normal pump uptake treatment (NORM) and belly halves targeted at a pump uptake of 30% were assigned to the high pump uptake

treatment (HIGH). Cure ingredients were formulated in accordance with manufacturer instructions (15% pump target = 313 g cure/1 kg water; 30% pump target = 156 g cure/1 kg water). Processing characteristics, bacon slice composition, and trained sensory attributes were evaluated. Treatment means for processing characteristics and bacon slice proximate composition were compared using PROC MIXED of SAS (SAS Inst. Inc., Cary, NC) with a fixed effect of treatment. Treatment means for sensory characteristics were compared using PROC GLIMMIX of SAS with a fixed effect of treatment and a random effect of panelist, day, and their interaction.

Results

In experiment 1, cook yields were 107.8% for the HIGH bellies and 101.5% for the NORM bellies. Bacon from the HIGH treatment in experiment 1 had lesser ($P = 0.04$) protein percentage and tended to have greater saltiness ($P = 0.07$) when compared with bacon from the NORM treatment in experiment 1. In experiment 2, cook yields were 97.4% for the HIGH bellies and 94.7% for the NORM bellies. Bacon from the HIGH treatment in experiment 2 had greater ($P = 0.02$) moisture percentage and greater gumminess ($P < 0.0001$) when compared with bacon from the NORM treatment in experiment 2. All other bacon slice composition and sensory attributes were not different ($P > 0.10$).

Conclusion

Overall, bacon slice composition and sensory attributes of bacon from bellies with greater pump retention were largely unaffected, accordingly it was concluded that cook yields ranging in level of pump retention does not affect most attributes of bacon.