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Meat and Muscle Biology™

Relationships Between Loin Color, Cut Thickness, Cooking Method, Water-Holding Capacity and Tenderness for Pork Cooked to 62.8°C

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Objectives

Consumer research has consistently shown that consumers over-cook pork creating a subpar eating experience. In 2011, the USDA/FSIS changed the internal doneness temperature from 71.1 to 62.8°C. However, how tenderness and water-holding capacity is affected in pork chops and roasts differing in thickness and color score cooked to 62.8°C is unknown. Understanding these relationships from chops and roasts cooked to 62.8°C is crucial to the pork industry.

Materials and Methods

Boneless and bone-in pork loins were purchased commercially on 3 selection trips to represent the National Pork Board subjective color scores of 2 and 4. The tenderloin was removed from the bone-in loins and randomly assigned to treatments. The sirloin and blade ends were removed, and bone-in ribeye chops were cut to either 1.3, 1.9 or 2.5 cm thick. Twelve chops were cut from each loin with a portion of the rib bone present in each chop. The blade end of the boneless loins was removed, and blade chops were cut to either 1.3, 1.9 or 2.5 cm thick. Three blade ends within color score were used to obtain 12 chops. The boneless center-cut chops were cut to either 1.3, 1.9 or 2.5 cm. Each boneless loin was cut into 12 chops. Boneless loin roasts (0.9 and 1.8 kg roasts) were cut from color score 4 boneless loins. Whole boneless center-cut loin roasts were cut into 2.7 kg roasts from the color score 2 loins. Prior to cooking, drip loss, pH and raw color were determined. Chops were then cooked to 62.8°C either by baking, grilling, pan frying, or pan-sautéing. Roasts were cooked to 62.8°C either by baking or grilling. Internal temperature was monitored by inserting an iron constantan thermocouple into the geometric center of the chop or roast. Cook yield, cook time, tenderness assessed by Warner-Bratzler shear force, and cooked internal color were determined. Each of the 24 treatments for each type of chop (2 colors × 3 thicknesses × 4 cooking methods) and the 8 roast treatments (4 weights × 2 cooking methods) were replicated 20 times.

Results

Cooking method and chop thickness affected cook yield and cook time. Baked chops had the longest cooking times and sautéed chops had the highest cook yields ($P < 0.05$). Grilled chops had the highest ($P < 0.05$) cook loss. The color score 4 blade and boneless chops were more tender than the color score 2 chops ($P < 0.05$). However, for bone-in chops, the inverse was reported ($P < 0.05$). Thickness had minimal effect on tenderness for the boneless chops ($P < 0.05$). Although bone-in and boneless, baked chops had the longest cooking times, they were the most ($P < 0.05$) tender. Baked whole boneless roasts had higher cook yield and longer cook times from grilled whole boneless roasts ($P < 0.05$). For boneless loin roasts (0.9 kg), baked roasts had higher cook yields, longer cook times, were tougher, and had a redder internal cook color than boneless loin roasts that were grilled ($P < 0.05$). Heavier boneless loin roasts had lower cook yield, longer cook times, and were tougher compared to lighter weight boneless loin roasts ($P < 0.05$). Baked tenderloins had higher cook yield, longer cook times and were redder in internal color than grilled tenderloin roasts ($P < 0.05$).

Conclusion

Overall, this study revealed that color, cooking method, and thickness impacted drip loss, cook yield, cook time, cooked color, and tenderness of blade, boneless, and bone-in chops, tenderloins, and roasts.