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The Effects of Ultimate pH and Color on Sensory Traits of Pork Loin Chops Cooked to a Medium-Rare Degree of Doneness

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Objectives

When pork loin chops are cooked to a medium degree of doneness (71°C), ultimate pH and color can significantly impact overall eating quality. However, it is not known how these quality parameters affect sensory tenderness, juiciness, and flavor scores of pork cooked to a medium-rare degree of doneness (63°C). Therefore, the objective was to determine the effects of pH and color on sensory characteristics of boneless pork loin chops cooked to an internal temperature of 63°C.

Materials and Methods

Center cut loin chops (296 total) from barrows and gilts, 5 different sire lines, and a range in pH of 5.36 through 6.23 were used. Early quality measurements (1 d postmortem) included instrumental color (CIE L*, a*, b*), visual color, and ultimate pH. Loins were then selected to fill a 3 × 5 factorial arrangement using 1 d postmortem ultimate pH and 1 d postmortem NPPC visual color score as predictors for trained sensory tenderness, juiciness, and flavor as well as instrumental tenderness. Ultimate pH categories were based on historical data and were as follows: > 5.95, *n* = 22; 5.80 to 5.95, *n* = 75; 5.65 to 5.80, *n* = 102; 5.50 to 5.65, *n* = 91; < 5.50, *n* = 6. Three color categories (1.5 to 2.5, 3.0 to 3.5, and ≥ 4.0) were assigned using NPPC visual color score. Loins were aged in vacuum packages at 4°C until 16 d postmortem. After aging, loins were cut into 2.54 cm thick chops, vacuum-packaged and frozen until sensory or instrumental tenderness analysis. Chops were weighed, cooked to 63°C, cooled to approximately 23°C,

weighed again to determine cook loss, and then evaluated for Warner-Bratzler shear force. Another chop was cooked to 63°C internal temperature and served warm to trained panelist to determine sensory traits. Coefficients of determination (R^2) were calculated to determine the predictability of ultimate pH and instrumental color on sensory tenderness, juiciness, and flavor. A one-way ANOVA and means separation test were used to determine specific differences among pH categories.

Results

Chops in the most elevated pH category (pH > 5.95) were significantly ($P < 0.05$) more tender than those in lesser pH categories. However, ultimate pH explained only 5% of the variation in sensory tenderness scores and less than 1% of the variation in juiciness and flavor scores. Visual color score was not predictive ($R^2 < 0.01$) of sensory tenderness, juiciness, or flavor. Also, neither instrumental L* ($R^2 = 0.02$), instrumental a* ($R^2 < 0.01$), nor instrumental b* ($R^2 = 0.03$) were predictive of sensory tenderness. No instrumental color parameter was predictive ($R^2 \leq 0.01$) of sensory juiciness or flavor.

Conclusion

Chops with a pH > 5.95 were at least 8.7% more tender ($P < 0.05$) than chops with a pH < 5.95. Visual and instrumental color were not predictive ($R^2 \leq 0.03$) of any sensory traits. Overall, pH does not influence sensory traits of pork chops cooked to medium-rare degree of doneness unless pH is at least 5.95.