

# Contributions of pH and Intramuscular Lipid to Sensory Quality of Fresh Pork Loin

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### Summary and Implications

The results suggest that high pH product (above pH 5.8) can be expected to be superior to lower pH product with regard to sensory quality, texture, and cook loss. In general, at high pH, greater lipid content does not improve sensory tenderness, sensory chewiness, sensory juiciness or star probe values. At low pH (below pH 5.5), pork is of inferior quality in virtually every category. At low pH, greater lipid content does not improve sensory quality. Lipid content does contribute to pork sensory traits in pork loins with intermediate pH (between pH 5.5 and 5.8). The effects of lipid content within the intermediate pH classifications indicate that only a small portion of the variation in sensory quality can be attributed to variation in lipid content.

### Materials and Methods

In a population of fresh pork loins generated from the National Barrow Show™ progeny tests from 1991, 1992, and 1994, data has been collected for composition, pH, and sensory quality. These loins were from pigs representing Berkshire, Chester White, Duroc, Hampshire, Landrace, Poland China, Spotted, and Yorkshire breeds. After accounting for variation due to year, breed, gender, test date

and halothane genotype, the contribution of lipid (determined chemically) and pH to fresh pork tenderness, chewiness, and juiciness was determined. Chops were classified in the following pH classes: Class A, >5.95, n=186; Class B, 5.80-5.95, n=236; class C, 5.65-5.80, n=467; class D, 5.50-5.65, n=441; class E, <5.50, n=205. Data were analyzed using a mixed linear model including pH classification, test, gender, halothane genotype, breed, and breed-by-gender interaction as fixed effects, with sire and dam within breed included as random effects. Correlations were determined within pH class.

### Results and Discussion

In general, lipid content was not a good indicator of eating quality. However, it was clear that higher pH resulted in more tender, juicier fresh pork loin (Table 1). Correlations indicated that increasing lipid content tended to increase sensory tenderness in pH class D (pH 5.5-5.65). Sensory tenderness was not affected by lipid content in pH class A, B, or E. Lipid content was not a significant source of variation for juiciness scores within any pH class. Intramuscular lipid was correlated with sensory texture traits primarily in classes C and D. Within class C and D, correlations indicate that increasing lipid content is associated with greater sensory tenderness, low sensory chewiness, and low star probe values. It was determined that at high pH (greater than 5.8) that lipid does not improve fresh pork sensory quality. This is likely because high pH has an overriding effect that results in high sensory quality. At low pH (<5.5), the product was not tender and not juicy. Under these conditions (pH<5.5), greater lipid content does not improve pork quality.

**Table 1. pH classification means for pork quality and sensory traits from the 1991, 1992, and 1994 National Barrow Show™ progeny tests**

	A	B	C	D	E
<i>pH range</i>	>5.95	5.80-5.95	5.65-5.80	5.50-5.65	<5.50
<i>n</i>	186	236	467	441	205
pH	6.13	5.87	5.72	5.58	5.42
Lipid % <sup>1</sup>	2.59 <sup>b</sup>	2.75 <sup>ab</sup>	2.89 <sup>a</sup>	2.82 <sup>a</sup>	2.83 <sup>ab</sup>
Star Probe (kg) <sup>2</sup>	5.7 <sup>d</sup>	6.27 <sup>c</sup>	6.55 <sup>b</sup>	6.63 <sup>ab</sup>	6.78 <sup>a</sup>
Sensory Juiciness <sup>3</sup>	3.3 <sup>a</sup>	3.2 <sup>a</sup>	3.1 <sup>b</sup>	3.0 <sup>c</sup>	2.9 <sup>c</sup>
Sensory Tenderness <sup>3</sup>	3.5 <sup>a</sup>	3.3 <sup>b</sup>	3.2 <sup>c</sup>	3.1 <sup>d</sup>	3.0 <sup>d</sup>
Sensory Chewiness <sup>3</sup>	2.6 <sup>d</sup>	2.8 <sup>c</sup>	2.9 <sup>b</sup>	3.0 <sup>a</sup>	3.0 <sup>a</sup>

a-e Means within a row lacking a common superscript differ (P<0.05)

<sup>1</sup> Intramuscular lipid content.

<sup>2</sup> Force necessary to compress a cooked pork loin to 20 % of its height.

<sup>3</sup> Sensory score with greater value representing a greater degree of juiciness, tenderness, or chewiness.

## Iowa State University Animal Industry Report 2007

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**Table 2. Pearson correlation of lipid content to sensory traits of cooked pork loin within defined pH classes from the 1991, 1992, and 1994 National Barrow Show™ progeny tests<sup>1</sup>**

	n	Star Probe <sup>2</sup>	Tenderness <sup>3</sup>	Chewiness <sup>3</sup>	Juiciness <sup>3</sup>
OVERALL	1535	<b>-0.250</b>	<b>0.125</b>	<b>-0.162</b>	0.020
A >5.95	186	-0.105	0.075	-0.108	-0.106
B 5.8-5.95	236	<b>-0.206</b>	0.121	<b>-0.230</b>	0.023
C 5.65-5.80	467	<b>-0.353</b>	<b>0.206</b>	<b>-0.222</b>	0.077
D 5.5-5.65	441	<b>-0.288</b>	<b>0.130</b>	<b>-0.172</b>	0.040
E <5.5	205	<b>-0.151</b>	0.022	0.001	-0.062

<sup>1</sup> Significant correlations are in bold (P<0.01).

<sup>2</sup> Force necessary to compress a cooked pork loin to 20 % of its height.

<sup>3</sup> Sensory score with greater value representing a greater degree of juiciness, tenderness, or chewiness.