4-2007

Influence of lipid content on pork sensory quality within pH classification

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Abstract

The objective of this project was to determine the contribution of lipid content to textural and sensory properties of fresh pork within defined pH classifications. Pigs (n = 1,535; from 248 sires and 836 dams) from the 1991, 1992, and 1994 National Barrow Show Sire Progeny Test were used in this study. The test included purebred Berkshire (107), Chester White (113), Duroc (249), Hampshire (220), Landrace (165), Poland China (101), Spotted (181), and Yorkshire (399) barrows (901) and gilts (634). Diets were uniform across breeds within test. The halothane (Hal 1843) genotype (1346 NN and 189 Nn) was determined. Pigs were slaughtered at 105 kg of BW, and samples of the LM were obtained from each carcass at the 10th rib. Star probe, sensory traits, and lipid content were determined on the LM from each pig. A pH classification of LM was assigned as follows: class A, >5.95, n = 186; class B, ≥5.80 to 5.95, n = 236; class C, ≥5.65 to 5.80, n = 467; class D, ≥5.50 to 5.65, n = 441; class E, <5.50, n = 205. Data were analyzed using a mixed linear model including pH classification, test, sex, halothane genotype, breed, and breed × sex interaction as fixed effects, with sire and dam within breed included as random effects. Correlations were determined within pH class. Lipid content was a significant source of variation for models predicting star probe values in class C and D and for chewiness in class B, C, and D. Increasing lipid content tended to increase sensory tenderness in pH class D. 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 is 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 high sensory tenderness, low sensory chewiness, and low star probe values. It is concluded that lipid content is a small source of variation in texture and tenderness of pork loin with pH between 5.80 and 5.50, but not at a greater or lesser pH.

Keywords

Food Science and Human Nutrition, fatty acid, lipid, pH, pork quality, sensory, tenderness

Disciplines

Agriculture | Animal Sciences | Food Science | Meat Science

Comments

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JOURNAL OF ANIMAL SCIENCE
The Premier Journal and Leading Source of New Knowledge and Perspective in Animal Science

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J ANIM SCI 2007, 85:1074-1079.
doi: 10.2527/jas.2006-413 originally published online November 22, 2006

Influence of lipid content on pork sensory quality within pH classification[1]

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ABSTRACT: The objective of this project was to determine the contribution of lipid content to textural and sensory properties of fresh pork within defined pH classifications. Pigs (n = 1,535; from 248 sires and 836 dams) from the 1991, 1992, and 1994 National Barrow Show Sire Progeny Test were used in this study. The test included purebred Berkshire (107), Chester White (113), Duroc (249), Hampshire (220), Landrace (165), Poland China (101), Spotted (181), and Yorkshire (399) barrows (901) and gilts (634). Diets were uniform across breeds within test. The halothane (Hal 1843) genotype (1346 NN and 189 Nn) was determined. Pigs were slaughtered at 105 kg of BW, and samples of the LM were obtained from each carcass at the 10th rib. Star probe, sensory traits, and lipid content were determined on the LM from each pig. A pH classification of LM was assigned as follows: class A, >5.95, n = 186; class B, ≥5.80 to 5.95, n = 236; class C, ≥5.65 to 5.80, n = 467; class D, ≥5.50 to 5.65, n = 441; class E, <5.50, n = 205. Data were analyzed using a mixed linear model including pH classification, test, sex, halothane genotype, breed, and breed × sex interaction as fixed effects, with sire and dam within breed included as random effects. Correlations were determined within pH class. Lipid content was a significant source of variation for models predicting star probe values in class C and D and for chewiness in class B, C, and D. Increasing lipid content tended to increase sensory tenderness in pH class D. 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 is 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 high sensory tenderness, low sensory chewiness, and low star probe values. It is concluded that lipid content is a small source of variation in texture and tenderness of pork loin with pH between 5.80 and 5.50, but not at a greater or lesser pH.

Key words: fatty acid, lipid, pH, pork quality, sensory, tenderness

J. Anim. Sci. 2007. 85:1074–1079
doi:10.2527/jas.2006-413

INTRODUCTION

Improving the consistency and quality of fresh pork is of importance to the swine industry. Lipid content has often been reported to influence the sensory traits of texture, tenderness, flavor, and juiciness (Candek-Potokar et al., 1998; Lonergan et al., 2001; Huff-Lonergan et al., 2002). Because of this relationship, marbling has been used to classify fresh pork for specific markets. The contribution of intramuscular lipid to sensory quality has been difficult to measure because some reports suggest a minor contribution to sensory quality (Wood et al., 1996; Fernandez et al., 1999; Channon et al., 2004), whereas others have suggested that a lipid content threshold must be met to ensure an acceptable eating experience (DeVol et al., 1988; Fortin et al., 2005).

It is clear that lipid content is not the single source of variation in determining pork sensory quality. Huff-Lonergan et al. (2002) reported that high pH results in greater sensory tenderness and juiciness scores and lower star probe values and sensory chewiness scores. Other considerations include the extent of postmortem aging and proteolysis (Wood et al., 1996, Wheeler et al., 2000; Zhang et al., 2006), rate of pH decline (Gardner et al., 2005), muscle type (Klont et al., 1998; Melody et al., 2004), and breed (van Laack et al., 2001).

[1]This journal paper of the Iowa Agriculture and Home Economics Experiment Station, Ames, Project No. 3700 and 3801 was supported by Hatch Act and State of Iowa funds. The authors acknowledge the presubmission commentary provided by C. Schultz-Kaster, L. Huskey, and J. Cannon.
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Received June 28, 2006.
Accepted November 6, 2006.

The objective of this project was to determine the contribution of lipid content to textural and sensory properties of fresh pork within defined pH classifications. To achieve this objective, we utilized a large data set that allowed investigation of the contribution of pH and intramuscular lipid to sensory quality after accounting for other known sources of variation such as breed, sex, and halothane genotype.

EXPERIMENTAL PROCEDURES

Animal Care and Use Committee approval was not obtained for this study because the data were obtained from an existing database (Goodwin, 1997).

Pigs (n = 1,535; from 248 sires and 836 dams) from the 1991, 1992, and 1994 National Barrow Show Sire Progeny Test were used in this study. The test included purebred Berkshire (107), Chester White (113), Duroc (249), Hampshire (220), Landrace (165), Poland China (101), Spotted (181), and Yorkshire (399) barrows (901) and gilts (634). Diets were uniform across breeds and within test. The halothane (Hal 1843) genotype (1346 NN and 189 Nn) was determined. Diets were uniform within test and across breeds. Pigs were slaughtered at 105 ± 4.3 kg of BW, and samples of the LM were obtained from each carcass at the 8th to 10th rib. Pork loin slices were collected and sealed in plastic bags at approximately 24 h after slaughter at the packing plant and transported to Iowa State University. Loin pH was measured and recorded at 24 h postmortem. Loin samples for sensory and star probe analysis were aged 7 to 10 d postmortem at 4°C in a vacuum sealed bag. Samples for lipid analysis were frozen at −20°C until analysis. Before lipid extraction, loin samples were trimmed of connective tissue and extramuscular adipose tissue. Samples were ground in a food processor, and aliquots were taken for DM determination and for total lipid determination.

Fatty Acid Analysis

Total lipids were extracted from the LM samples by using chloroform and methanol (2:1, vol:vol) mixture (Fisher Scientific, Pittsburgh, PA; Folch et al., 1957). The lipids were methylated directly with acetyl chloride (ACROS Organics, NJ) and methanol according to Lepage and Roy (1986). Fatty acid methyl esters were separated as described by Zhang et al. (2007).

Sensory and Star Probe Analysis

Sensory analysis and star probe analysis were conducted on chops aged 7 to 10 d at 4°C. These samples were never frozen. Chops for sensory and star probe analysis from each sample were broiled to an internal temperature of 71°C in an electric oven broiler preheated to 210°C. The temperature of each chop was monitored individually using thermocouples (Chromega/Alomega, Omega Engineering, Stamford, CT) attached to an Omega digital thermometer (Model DSS-650, Omega Engineering). The chops were cooled to room temperature.

Two broiled chops were evaluated for instrumental texture using a circular, 5-pointed star-probe attached to an Instron Universal Testing Machine (Model 1122, Instron, Norwood, MA). The probe was 9 mm in diam., with 6 mm between each point. The angle from the end of each point up into the center was 48°. A 100-kg load cell was used with a crosshead speed of 200 mm/min. The star probe attachment was used to determine the amount of force needed to puncture and compress the chop to 20% of the initial sample height. Each chop was compressed 3 times (Lonergan and Prusa, 2002).

A trained, fresh pork loin sensory panel was used to evaluate chops from each carcass. A broiled loin chop was cut such that three 1.3-cm cubes were removed from the center of the chop. Each panelist evaluated juiciness, tenderness, chewiness, and pork flavor. The scale was anchored on the left with a term representing a low degree of juiciness, tenderness, and chewiness. The term on the right end of the scale represented a high degree of each characteristic (Huff-Lonergan et al., 2002).

Statistical Analysis

Data were analyzed using a mixed linear model (PROC MIXED, SAS Inst. Inc., Cary, NC) including test date, sex, halothane genotype, breed, and breed × sex interaction as fixed effects, with sire and dam within breed included as random effects. Pearson correlations were calculated using PROC CORR of SAS.

A pH classification was assigned as follows: class A, >5.95, n = 186; class B, ≥5.80 to 5.95, n = 236; class C, ≥5.65 to 5.80, n = 467; class D, ≥5.50 to 5.65, n = 441; class E, <5.50, n = 205. These classes were based on previous reports of an average pH of approximately 5.80 with a SD of 0.15 (Huff-Lonergan et al., 2002). Previously, we characterized a smaller data set (n = 130) with an average 24-h pH of 5.66 with a SD of 0.14 (Wagner et al., 2006). Within each pH category, data were analyzed using PROC MIXED, where the model included test, sex, halothane genotype, breed, and the breed × sex interaction as fixed effects, sire and dam within breed as random effects, and lipid content as a linear covariate. Within each pH classification, product quality and composition correlations were determined using PROC CORR.

RESULTS AND DISCUSSION

Effect of breed and halothane genotype on pork carcass composition and quality have been reported elsewhere (Goodwin, 1997). Summary statistics are provided in Table 1, and Pearson correlations are reported in Table 2. The influence of intramuscular lipid on objective measures of tenderness in pork is not consistent. Some researchers (Candek-Potokar et al., 1998; Huff-

Table 1. Pork quality summary statistics for LM from the 1991, 1992, and 1994 National Barrow Show progeny tests

	Mean	Maximum	Minimum	SD
24-h pH	5.71	6.68	5.05	0.21
Cook loss,[1] %	23.96	44.18	6.22	5.95
Lipid content,[2] %	2.95	7.89	0.84	1.16
Star probe,[3] kg	6.27	9.93	2.89	1.10
Sensory juiciness[4]	3.1	5.0	1.0	0.69
Sensory tenderness[4]	3.2	5.0	1.0	0.62
Sensory chewiness[4]	2.8	5.0	1.0	0.59

[1]Weight lost during cooking in a broiler to 71°C.
[2]Intramuscular lipid content determined by the method of Folch et al. (1957).
[3]Force necessary to compress a cooked pork loin to 20% of its initial height (Lonergan and Prusa, 2002).
[4]Sensory score with a greater value representing a greater degree of juiciness, tenderness, or chewiness.

Lonergan et al., 2002) demonstrated significant negative relationships between intramuscular lipid and objective measures of textural integrity. These relationships are typically not strong. Other reports have demonstrated no relationship between intramuscular lipid and instrumental measures of textural integrity (Hovenier et al., 1993). Blanchard et al. (2000) demonstrated a significant effect of intramuscular lipid content on shear force, with a high lipid classification (2 to 9%) having a lower shear force value than products with lower percentages of lipid. However, there was no significant effect of lipid content classification on sensory juiciness, tenderness, or overall acceptability.

In the current study, lipid content was significantly correlated with star probe, sensory tenderness, and sensory chewiness (Table 2). Though significant, the magnitude of the correlations between lipid content and these traits indicate that other factors also contribute to the variation in sensory and instrumental texture. Lipid content was not correlated with sensory juiciness or cook loss. These results confirm the observations that the effect of intramuscular lipid content on sensory quality is not consistent (Fernandez et al., 1999). Wood et al. (1996) reported slightly different results in that lipid content was not correlated to textural parameters but was significantly correlated to sensory juiciness. The results of the current experiment do not support the hypothesis that greater lipid content is required for superior eating quality (with regard to sensory juiciness, tenderness, and chewiness).

High ultimate pH has been associated with superior sensory quality (Cameron et al., 1990; Huff-Lonergan et al., 2002) and lower Warner-Bratzler shear values (Gardner et al., 2005). In the current experiment, sensory chewiness and tenderness were correlated with ultimate pH, indicating that greater pH is associated with greater tenderness and lower chewiness scores. Consistent with the sensory results, pH was negatively correlated with star probe values. Sensory juiciness was correlated with pH, albeit a weak correlation. This is likely due to the relatively strong correlation between pH and cook loss percentage. Not surprisingly, sensory texture traits were correlated with star probe values. Sensory juiciness was correlated with sensory chewiness and sensory tenderness.

Pork lipid composition varies mostly to dietary factors, but to a lesser extent it is affected by genetic factors (De Smet et al., 2004). In an effort to determine the extent to which lipid profile influenced pork quality, correlations between fatty acid profile and pork quality and composition were determined (Table 3). Lipid content was correlated with myristic, palmitic, palmitoleic, stearic, and oleic acids and strongly negatively correlated with linoleic and arachidonic acid. In general, specific fatty acids did not demonstrate stronger correlations with sensory traits than total lipid, suggesting that normal variation in fatty acid profile does not contribute to variation in pork quality. Previous reports of fatty acid profile contributing to variation in pork quality are in the context of extreme variation in fatty acid saturation in response to variation in diet (Cameron et al., 2000). It is of interest that, even though lipid content was not correlated with cook loss, the proportions of palmitoleic, oleic, linoleic, and arachidonic acids all were correlated with cook loss.

Table 2. Pearson correlations between pH, lipid content, star probe values, and sensory quality of fresh pork LM (n = 1,524) from the 1991, 1992, and 1994 National Barrow Show progeny tests[1]

	Cook loss	Lipid content	Star probe	Sensory juiciness	Sensory tenderness	Sensory chewiness[5]
24-h pH	**–0.300**	–0.005	**–0.182**	**0.122**	**0.198**	**–0.191**
Cook loss[2]		0.040	**0.218**	**–0.542**	**–0.283**	**0.248**
Lipid content[3]			**–0.245**	0.020	**0.126**	**–0.162**
Star probe[4]				**–0.261**	**–0.540**	**0.506**
Sensory juiciness[5]					**0.493**	**–0.302**
Sensory tenderness[5]						**–0.745**

[1]Significant correlations are shown in bold ($P < 0.01$).
[2]Weight lost during cooking in a broiler to 71°C.
[3]Intramuscular lipid content determined by the method of Folch et al. (1957).
[4]Force necessary to compress a cooked pork loin to 20% of its initial height (Lonergan and Prusa, 2002).
[5]Sensory score with a greater value representing a greater degree of juiciness, tenderness, or chewiness.

Table 3. Pearson correlations between fresh pork quality and fatty acid profile (n = 1504) for LM from the 1991, 1992, and 1994 National Barrow Show progeny tests[1]

Fatty acid	pH	Cook loss[2]	Lipid content[3]	Star probe[4]	Sensory juiciness[5]	Sensory tenderness[5]	Sensory chewiness[5]
C14:0[6]	**0.091**	–0.031	**0.528**	**–0.209**	0.020	**0.130**	**–0.165**
C16:0[6]	**0.105**	0.003	**0.434**	**–0.182**	**0.061**	**0.119**	**–0.055**
C16:1[6]	0.017	**0.107**	**0.286**	**–0.079**	0.027	**0.124**	**–0.130**
C18:0[6]	–0.025	0.0261	**0.129**	**–0.109**	–0.009	**0.091**	–0.097
C18:1[6]	**–0.089**	**0.141**	**0.444**	**–0.084**	–0.008	**0.079**	**–0.085**
C18:2[6]	–0.039	**–0.0975**	**–0.687**	**0.205**	–0.017	**–0.155**	**0.147**
C20:3/C20:4[7]	0.035	**–0.148**	**–0.630**	**0.209**	**–0.067**	**–0.202**	**0.129**

[1]Significant correlations are shown in bold ($P < 0.01$).
[2]Weight lost during cooking in a broiler to 71°C.
[3]Intramuscular lipid content determined by the method of Folch et al. (1957).
[4]Force necessary to compress a cooked pork loin to 20% of its initial height (Lonergan and Prusa, 2002).
[5]Sensory score with a greater value representing a greater degree of juiciness, tenderness, or chewiness.
[6]Fatty acid as a percentage of total lipid, determined as described by Zhang et al. (2007).
[7]Ratio of 20:3 to 20:4 fatty acids, determined as described by Zhang et al. (2007).

Because pH was correlated with all sensory traits and with cook loss, pH classifications were defined to determine the specific effect of pH on sensory quality (Table 4). It is noteworthy that pH classification had very little effect on lipid content. The intermediate pH classes (C and D) had greater lipid content than did the greatest pH class (class A). No other differences in lipid content were noted. Sensory quality was affected by pH classification. Class A had greater sensory tenderness scores and lower sensory chewiness scores and lower star probe values than did any other class. The 2 greatest pH classes (A and B) had the greatest sensory juiciness scores. Not surprisingly, the lowest pH class (E) had the greatest cook loss. The 2 lowest pH classifications (D and E) had the lowest sensory juiciness and tenderness scores and the greatest sensory chewiness scores. The lowest pH class (E) had greater star probe values than did the 3 greatest classes (A, B, and C). These results suggest that pH has a large role in determining the protein contribution to sensory quality. With high pH, very little product is lost during storage and cooking. Thus the pork is expected to be juicier, softer on the first bite, and less chewy during sustained mastication. It is hypothesized that greater pH will result in more myofibrillar fragmentation. In support of this hypothesis, Gardner et al. (2005) reported more extensive activation of μ-calpain, greater degradation of desmin and lower Warner-Bratzler shear force values as ultimate pH increased. It is clear that postmortem proteolysis contributes to a host of properties, such as texture and water holding capacity that can influence sensory quality of pork (Melody et al., 2004; Bee et al., In press).

It was hypothesized that lipid content affects pork sensory quality differently in response to pH classes. Table 5 summarizes the Pearson correlations of lipid content with sensory quality within each pH class. Lipid content was correlated to cook loss within the greatest pH class (A), but not within any other class. Lipid content was not correlated to juiciness in the complete sample set (Table 2) or within any pH class (Table 5).

Table 4. pH class and pork quality and sensory traits for LM from the 1991, 1992, and 1994 National Barrow Show progeny tests[1]

Item	Class A, pH >5.95	SD	Class B, pH ≥5.80 to 5.95	SD	Class C, pH ≥5.65 to 5.80	SD	Class D, pH ≥5.50 to 5.65	SD	Class E, pH <5.50	SD
No. of progeny	186		236		467		441		205	
pH	6.13	0.15	5.87	0.04	5.72	0.04	5.58	0.04	5.42	0.07
Cook loss,[1] %	21.2[e]	5.5	22.6[d]	5.4	24.0[c]	5.8	25.2[b]	5.8	26.6[a]	5.85
Lipid,[2] %	2.59[b]	1.06	2.75[ab]	1.2	2.89[a]	1.2	2.82[a]	1.17	2.83[ab]	1.03
Star probe,[3] kg	5.7[d]	1.28	6.27[c]	1.01	6.55[b]	1.13	6.63[ab]	1.03	6.78[a]	0.91
Sensory juiciness[4]	3.3[a]	0.65	3.2[a]	0.624	3.1[b]	0.6	3.0[c]	0.72	2.9[c]	0.71
Sensory tenderness[4]	3.5[a]	0.72	3.3[b]	0.59	3.2[c]	0.57	3.1[d]	0.63	3.0[d]	0.52
Sensory chewiness[4]	2.6[d]	0.63	2.8[c]	0.57	2.9[b]	0.53	3.0[a]	0.60	3.0[a]	0.60

[a–e]Means within a row lacking a common superscript differ ($P < 0.05$).
[1]Weight lost during cooking in a broiler to 71°C.
[2]Intramuscular lipid content determined by the method of Folch et al. (1957).
[3]Force necessary to compress a cooked pork loin to 20% of its initial height (Lonergan and Prusa, 2002).
[4]Sensory score with a greater value representing a greater degree of juiciness, tenderness, or chewiness.

Table 5. Pearson correlation of lipid content to sensory traits of cooked pork loin within defined pH classes for LM from the 1991, 1992, and 1994 National Barrow Show progeny tests[1]

pH class	No. of progeny	Cook loss[2]	Star probe[3]	Tenderness[4]	Chewiness[4]	Juiciness[4]
Overall	1,535	0.040	**–0.25**	**0.125**	**–0.162**	0.020
Class A, pH >5.95	186	**0.215**	–0.105	0.075	–0.108	–0.106
Class B, pH ≥5.80 to 5.95	236	0.110	**–0.206**	0.121	**–0.230**	0.023
Class C, pH ≥5.65 to 5.80	467	0.021	**–0.353**	**0.206**	**–0.222**	0.077
Class D, pH ≥5.50 to 5.65	441	–0.009	**–0.288**	**0.130**	**–0.172**	0.040
Class E, pH <5.5	205	0.013	**–0.151**	0.022	0.001	–0.062

[1]Significant correlations are shown in bold ($P < 0.01$).
[2]Weight lost during cooking in a broiler to 71°C.
[3]Force necessary to compress a cooked pork loin to 20% of its initial height (Lonergan and Prusa, 2002).
[4]Sensory score with a greater value representing a greater degree of juiciness, tenderness, or chewiness.

Lipid content was not correlated with star probe value, sensory tenderness, or sensory chewiness in loins classified in class A. Within class B, only star probe value and chewiness were correlated with lipid content. Within class C and D, all 3 indicators of texture (star probe value, sensory chewiness, and sensory tenderness) were correlated to lipid content. In general, the strongest correlations to lipid content were observed in class C (pH 5.65 to 5.80). Lipid was significantly correlated with star probe value in the low pH classification (E), but that correlation was rather weak (r = –0.151).

The effect of lipid content within each pH classification was determined (Table 6). The lipid content covariate was a significant source of variation for models predicting star probe values in class C and D (pH 5.50 to 5.80). Similarly, intramuscular lipid was also a significant source of variation for chewiness in class C and D (pH 5.50 to 5.80). Specifically, increasing lipid content decreased chewiness score (indicating less chewy) and star probe value within these classes. The slope for lipid content effect on star probe for chops with pH values between 5.50 and 5.80 (class C and D) predicts that increasing lipid content by 1% decreases star probe value by 0.2 kg. Increasing lipid content tended to increase sensory tenderness in pH class D (pH 5.50 to 5.65). Sensory tenderness was not affected by lipid content in pH class A, B, C, or E. Lipid content was not a significant source of variation for sensory juiciness scores within any pH class.

The results suggest that high pH product (above pH 5.80; Table 4) can be expected to be superior to lower pH product with regard to sensory quality, texture, and cook loss. In general, at high pH, addition of lipid does not improve sensory tenderness, sensory chewiness, sensory juiciness, or star probe values. At low pH (below pH 5.50; Table 4) pork is of inferior quality in virtually every category. At low pH, greater lipid content does not improve sensory quality. Importantly, significant correlations between lipid content and sensory quality

Table 6. Summary of the effect of lipid on sensory quality within pH class for LM from the 1991, 1992, and 1994 National Barrow Show progeny tests[1]

	pH class				
Item	A, pH >5.95	B, pH ≥5.80 to 5.95	C, pH ≥5.65 to 5.80	D, pH ≥5.50 to 5.65	E, pH <5.5
Cook loss[2]					
Estimated slope	**1.22**	0.2	0.047	0.00	0.27
P-value	0.013	0.56	0.86	0.97	0.52
Star probe[3]					
Estimated slope	0.09	–0.059	**–0.208**	**–0.20**	–0.37
P-value	0.366	0.33	<0.01	<0.01	0.08
Juiciness[4]					
Estimated slope	**–0.15**	–0.017	–0.016	0.018	0.014
P-value	0.015	0.69	0.61	0.62	0.79
Tenderness[4]					
Estimated slope	0.067	0.00	0.04	0.055	0.019
P-value	0.24	0.86	0.13	0.08	0.66
Chewiness[4]					
Estimated slope	0.04	–0.06	**–0.05**	**–0.15**	–0.01
P-value	0.42	0.06	0.03	0.002	0.83

[1]Significant lipid contribution to each trait is identified by a significant estimated slope (shown in bold).
[2]Weight lost during cooking in a broiler to 71°C.
[3]Force necessary to compress a cooked pork loin to 20% of its initial height (Lonergan and Prusa, 2002).
[4]Sensory score with a greater value representing a greater degree of juiciness, tenderness, or chewiness.

are noted at the intermediate pH (between pH 5.50 and 5.80). In this data set, it can be concluded that intramuscular lipid contributed to sensory quality of approximately 58% of the loins. The correlations and linear covariate 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. Other sources of variation of sensory quality should be sought to effectively predict ultimate pork sensory quality. The results presented herein can be utilized to develop specifications for high quality fresh pork.

In conclusion, this report confirms that ultimate pH has a significant role in determining the pork sensory quality. Lipid content influences pork sensory quality only at intermediate pH. The results demonstrate that increasing lipid content in pork loin would be expected to minimally improve sensory quality in loins with intermediate ultimate pH values (5.50 to 5.80). However, the results also clearly demonstrate that increasing lipid content will not consistently improve the quality of low pH pork (pH <5.50), which has poor sensory quality, or high pH pork (pH >5.80) that has superior sensory quality.

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