Pork 101 Topics

Pork 101 Topics (Day 2 Morning)

Pork 101 Topics (Day 2 Afternoon)
What is Pork Quality?

- Summation of those attributes that make pork desirable as a human food.
Pork Quality Attributes

Marbling scores correspond to intramuscular lipid content.

1.0  Pale pinkish gray to white  
2.0  Grayish pink  
3.0  Reddish pink  
4.0  Dark reddish pink  
5.0  Purplish red  
6.0  Dark purplish red

Minolta L* values use D65 daylight light source & measured on day one.
Color & Drip Loss Relationship

pH Decline and Pork Color

Genetics  Nutrition  On-Farm Handling  Transportation  Pre-Slaughter Handling  Carcass Handling  Stunning
Areas to Discuss

- Overview of pre-harvest stressors in pigs
- Practical importance of pre-harvest handling
  - Transport losses in market weight pigs
  - Carcass bruising and trim loss
  - Pork quality defects
  - Economic implications
- Review best handling practices to minimize stress
“Pig Handling 101”

- During rearing, pigs experience relatively few changes to their environment and may have limited exposure to humans
- Changes in the pig’s environment and/or the presence of an unfamiliar human can cause fear
- Examples of pigs being frightened during loading include:
  - Moving to the corners of barn pens
  - Trying to escape through small openings in gates
  - Balk at moving objects, shadows, sunlight, changes in flooring, wind, etc.


“Pig Handling 101”

- Pigs have good memories and can be trained
  - Examples: show pigs and racing pigs at the fair
- The natural behaviors of pigs are to:
  - Follow one another during handling
  - Move from dark to well lit areas
- A thorough understanding of the natural behaviors of pigs and the flight zone are needed for the optimal handling and movement of pigs


Flight Zone and Point of Balance

(Photo courtesy of the National Pork Board’s TQA Handbook, 2004)
Common Pig Handling Tools

At the Farm
- Sorting Board
- Livestock Paddle
- Electric Prod

At the Plant
- Flag
- Livestock Paddle
- Witch’s Cape

Photos courtesy of www.qcsupply.com and www.grandin.com

Overview of Pre-harvest Stressors

Photos provided by: Dr. Mike Ellis, National Pork Board, and Pork Magazine

Economic Impact of Transport Losses

- Ritter et al., 2009
  - Transport losses cost the U.S. swine industry ~$46 million in 2006
  - This translates to approximately $0.44 per pig marketed

Carcass Bruising and Trim Loss

- Carcass bruising can be caused by:
  - Rough handling
  - Poorly maintained facilities
  - Overcrowding pigs during transport
  - Fighting


(Photos courtesy of Lonergan et al., 2006)

Live Market Hog Evaluation and Grading
Developed by:
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How Do Animals Get Fat?

- Top to Bottom
- Front to Rear
- Gender Effects
  - Gilts leaner than barrows
Practice 1

<table>
<thead>
<tr>
<th>Dress %</th>
<th>77.6%</th>
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<tbody>
<tr>
<td>Hot Carcass Wt</td>
<td>187</td>
</tr>
<tr>
<td>10th Rib Fat LEA</td>
<td>0.60</td>
</tr>
<tr>
<td>Muscle Score</td>
<td>0.50</td>
</tr>
<tr>
<td>% Lean</td>
<td>8.0</td>
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<tr>
<td>in²</td>
<td>2</td>
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</table>

Live Weight = 241 lbs

Let’s Look at Some Live Pigs!
Lean Quality
Lean Quantity

Pork Carcass Measurements

Backfat Measurements:
Last Lumbar Vert.
Last Rib
1st Rib

Carcass Length:
Anterior Edge of First Rib to Anterior Edge of Aitch Bone

Fat Free Lean Equation

Pounds of Fat Free Lean = 8.5876 – (21.8957 x 10th rib fat, in) + (3.0047 x LEA, in.2) + (0.4650 x HCWT, lbs.)

Percentage Fat Free lean = (Pounds of Fat Free Lean / Hot Carc. Wt.) x 100
Carcass Weight Pricing

Producer Paid on a Carcass Weight Basis
Dressing Percentage Is The Most Important Factor!

250 lbs. 65 lbs.
26%
74%
185 lbs.

“Dress-Off Items”
Head, Viscera, Pluck, Hair, Blood, etc.

Lean Value Pricing

- Grid carcass weight and leanness adjustments may be applied:
  - Fixed premiums (known dollar amount)
  - Relative premiums (percent adjustment)
- Carcasses are not typically USDA (third party) graded
  - Packer employee measures
    - Objective measures
      - Fat-O-Meater, ruler, ultra-sound, etc.

EVALUATIONS OF CUTABILITY

Expected Yields of the Four Lean Cuts, by Grade, Based on Chilled Carcass Weight

<table>
<thead>
<tr>
<th>Grade</th>
<th>Yield</th>
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<tbody>
<tr>
<td>U.S. No. 1</td>
<td>60.4% and greater</td>
</tr>
<tr>
<td>U.S. No. 2</td>
<td>57.4% to 60.3%</td>
</tr>
<tr>
<td>U.S. No. 3</td>
<td>54.4% to 57.3%</td>
</tr>
<tr>
<td>U.S. No. 4</td>
<td>Less than 54.4%</td>
</tr>
</tbody>
</table>

1These yields will be approximately 1 percent lower if based on hot carcass weight.
Factors in the Slaughter Process Affecting Pork Quality

South Dakota State University
Jennifer Bok
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The Ohio State University
Dustin Boler

National Pork Board
David Meisinger

Oklahoma State University
Jacob Nelson

Factors that can Impact Pork Quality

- Pre-stun handling
- Stunning
- Stun-to-stick interval
- Carcass position during sticking
- Bleeding time
- Scalding/skinning
- Buffer rails
- Evisceration
- Rail-outs
- Total stun-to-chill time

Harvest
Pork Fabrication & Defects

Cutting Styles
Fresh Sausage Manufacture

Steps in Making Fresh Sausage

• Initial Grinding
  – Coarse grind-3/4" -1" plate
  • Lean/fat meats ground separately
  • Frozen and/or fresh
  • Uniform particle size
Enhanced Pork Technology

- Enhanced/unseasoned pork
  - Lower injection levels – 7-15%
  - Additional water and phosphate improves juiciness, and resistance to cooking abuse

- Enhanced/seasoned pork
  - Higher injection levels with tumbling to guarantee tenderness
  - Seasoning applied to the surface of the product
  - Convenience/Variety
Cured Pork Technology

Boneless Ham Production

**Raw Materials**
- lean to fat
- weight
- color
- bone/skin removal
- SQ fat
- seam fat

**Trimming**
- % pump

**Brine Injection**
**Stuff/Net**

**Thermal Processing—Chilling**
- yield
- color
- shape

**Slicing**
- whole
- half
- thickness

**Packaging**
- weight

**Tumbling**
- dispersion/bind

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Objectives

• Develop a basic understanding of the factors used to evaluate the quality and determine the value of processed meat products
  – Bacon
  – Bone-in or boneless hams
  – Fresh pork sausages
  – Enhanced [marinated] pork products
Pork 101 Participant Comments

- What did you think was most valuable about Pork 101?
  - “I was most interested in learning the different cuts so the hands‐on experience of learning the different cuts was great!”
  - “I learned a lot about further processing and making products that I did not know.”
  - “Grading hogs‐understanding of pH and its application to quality.”

- “Instructors, students were very knowledgeable and passionate about the subjects! Really enjoyed the course!”

Pork 101 – 2017 Classes

May 23 - 25, 2017 – Texas A&M University
College Station, TX USA

October 23 - 25, 2017 – Iowa State University
Ames, IA USA

For more details, please visit: www.pork101.org