Ethanol Co-products – Beef Quality Implications

A Branded Beef Perspective

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Director of Supply Development
Certified Angus Beef
Discussion Outline

• Quality trends in US beef industry
• Brief review of current thinking on marbling deposition in feedlot cattle
• Review of literature on feeding of ethanol co-products and their impact on beef quality
• Topics for further consideration
Top 10 beef quality concerns from purveyors, restaurateurs and retailers

1. Insufficient Marbling
2. Cut Weights Too Heavy
3. Lack of Uniformity In Cuts
4. Inadequate Tenderness
5. Excess Fat Cover
6. Inadequate Juiciness
7. Inadequate Flavor
8. Inadequate Overall Palatability
9. Low Cutability
10. Too Large Ribeyes

Source: 2005 National Beef Quality Audit
Lost Opportunity- QG

Cost = $26.81/hd

Source: 2005 National Beef Quality Audit
Angus-type Cattle
Earning the CAB® Brand

In FY06, 1% = 38 million pounds!

Fiscal Year (October 1 - September 30)
Where are cattle missing the CAB® target?

<table>
<thead>
<tr>
<th>Defect</th>
<th>Total Occurrence</th>
<th>Solo Defect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate Marbling</td>
<td>85.48</td>
<td>68.17</td>
</tr>
<tr>
<td>Yield Grade</td>
<td>15.71</td>
<td>6.08</td>
</tr>
<tr>
<td>Maturity</td>
<td>5.08</td>
<td>1.21</td>
</tr>
<tr>
<td>Capillary Rupture</td>
<td>1.88</td>
<td>0.15</td>
</tr>
<tr>
<td>Dark Cutter</td>
<td>1.93</td>
<td>0.25</td>
</tr>
<tr>
<td>Dairy-type Muscling</td>
<td>1.06</td>
<td>0.10</td>
</tr>
<tr>
<td>Hump Height</td>
<td>0.43</td>
<td>0.01</td>
</tr>
<tr>
<td>Coarse Marbling</td>
<td>0.14</td>
<td>0.02</td>
</tr>
</tbody>
</table>

2005 CAB Consist Data (26,707 hd)
Marbling Score Distribution Among CAB® Certified Carcasses

2005 CAB Consist Data (26,707 hd)
The Choice-Select Line

<table>
<thead>
<tr>
<th></th>
<th>USDA SELECT</th>
<th>USDA CHOICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>380</td>
<td>4.4%</td>
<td></td>
</tr>
<tr>
<td>390</td>
<td>1.3%</td>
<td>2.9%</td>
</tr>
<tr>
<td>400</td>
<td></td>
<td>3.2%</td>
</tr>
<tr>
<td>410</td>
<td></td>
<td>6.1%</td>
</tr>
</tbody>
</table>

Source: 2005 CAB Consist Data (26,707 hd)

Significant premiums and discounts live in the tales of bell curves.
Declining Quality Grades

Primary Factors

• Increasing health problems in the beef cattle industry
• Increased use of ethanol co-products by feedlots
• Structural and management changes in the feeding industry
• Marbling development is a lifetime event
• Timing, number, and potency of implant regime

Corah and McCully, CAB, 2006
Declining Quality Grades
Secondary Factors

• Genetics
  – Limited improvement in IMF
  – Increased growth
• Disposition
• Vitamin A levels
• Gender
• Sorting

Corah and McCully, CAB, 2006
Boxed Beef Cutout Values 2006 YTD

Grade/Brand

Thru Nov 1
Current thinking on marbling deposition in feedlot cattle

Birth  Weaning  Placement into Feedlot  8 mo.

Harvest

Key window determining later marbling
Amount of Marbling is Dependent Upon **Number** and **Size** of Fat Cells

Source: Cianzio et al. (1985)
Examples of Early Management Effects on Marbling

**Miller et al. (1987)**
20-mo old steers fed 168 d

Marbling score
- High: SL^99^ 5.1
- Low: SL^58^ 4.4

**Bruns et al. (2005)**

Marbling score
- No Implant: SM^65^ 5.7
- Delayed Implant: SM^36^ 5.3
- Early Implant: SM^20^ 5.0

**Meyer et al. (2005)**

Marbling score
- Early weaning: SM^30^ 5.3
- Traditional Weaning: SL^73^ 4.9

**Roeber et al. (2001)**

Marbling score
- None: SM^31^ 5.4
- 1: SL^99^ 5.0
- 2: SL^87^ 4.7

Prefinishing Nutritional Plane

Hospital visits
## Effect of Distillers Products on Marbling and Yield Grade

<table>
<thead>
<tr>
<th>Distiller’s Grain Level (DM basis)</th>
<th>Marbling Score</th>
<th>Calculated YG Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>5.55&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.96&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>1-15%</td>
<td>5.49&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.08&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>16-29%</td>
<td>5.46&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>3.05&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Over 29%</td>
<td>5.35&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.06&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a, b</sup> Differing superscript in same row (P<.05)

**Source:** Dr. Chris Reinhardt, KSU, 2006; 14 study review
Effect of Distillers Products on Marbling Score

<table>
<thead>
<tr>
<th>Product</th>
<th>Trials</th>
<th>Level, % diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condensed solubles</td>
<td>3</td>
<td>0-20</td>
</tr>
<tr>
<td>Dried grains &amp; solubles</td>
<td>11</td>
<td>0-75</td>
</tr>
<tr>
<td>Wet grains &amp; solubles</td>
<td>15</td>
<td>0-50</td>
</tr>
</tbody>
</table>

Source: Dr. Fred Owens, 2006; 29 trial review
Marbling score

Regression weighted by cattle number across all sources.
(Linear P<.02; Quad P<.01)

Wet or Dried Distiller Grains or Condensed Solubles, %

Owens, 2006
Change in marbling score with dietary CDS was not significant.

Owens, 2006
Dried Distillers Grains and Solubles

Regression weighted by number of cattle for Dried Distillers Grains plus Solubles.
(Linear P<.07; Quadratic P < .01)

Owens, 2006
Change in marbling score with wet distillers grains plus solubles was not significant.

Owens, 2006
Other Quality Considerations

- **Flavor profile?**
  - No effect with up to 50% distillers grains (Minnesota, 2004; Nebraska, 2006)

- **Tenderness?**
  - No effect with up to 50% distillers grains (Minnesota, 2004; Nebraska, 2006)

- **Shelf stability?**
  - Trend in diminished color stability with increasing levels of WDG or DDG (Minnesota, 2004)

- **Lean and fat color?**
  - Carotenes and other pigments accumulate in fat
  - Distillers grains influence color of fat in milk (Wisconsin, 2005)
Which circle above is larger? They are the same size. Fat color can influence perceived marbling. Is marbling all the same color?
Which circle above is larger? They are the same size. Background color can influence perceived marbling.
Considerations Beyond Simple Inclusion Rate

- Calf feds vs. Yearlings and previous plane of nutrition
- High marbling vs. Low marbling genetics
- Distiller grain variability between plants
- Distiller grain variability between corn varieties
- Proper classification of different types of distiller grains
- Efficiency improvements in distilling process
- Sulphur levels and negative interactions (Cu absorption)
What we can’t do!
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