High Plains BioFuels CoProduct Conference

February 20, 2008

Summary of KSU Research

Brandon Depenbusch
Topics to Discuss:

• Optimal level
• Corn vs. Sorghum
• Dry vs. Wet
• Is it possible to decrease roughage levels with DGS?
• DGS from traditional vs. fractionation process
Optimal Level of Corn DDGS

- 0, 15, 30, 45, 60, and 75% Corn DDGS
- 9 pens / treatment
- 6 to 7 heifers / pen
- 153 DOF
## Experimental Diets

<table>
<thead>
<tr>
<th>Ingredient, %</th>
<th>0</th>
<th>15</th>
<th>30</th>
<th>45</th>
<th>60</th>
<th>75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flaked corn</td>
<td>77</td>
<td>64</td>
<td>49</td>
<td>34</td>
<td>19</td>
<td>4</td>
</tr>
<tr>
<td>Corn DDGS</td>
<td>-</td>
<td>15</td>
<td>30</td>
<td>45</td>
<td>60</td>
<td>75</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Molasses</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Urea</td>
<td>1.2</td>
<td>1.0</td>
<td>0.9</td>
<td>0.7</td>
<td>0.6</td>
<td>0.4</td>
</tr>
<tr>
<td>Supplement</td>
<td>3.8</td>
<td>4.0</td>
<td>5.1</td>
<td>5.3</td>
<td>5.4</td>
<td>5.6</td>
</tr>
<tr>
<td>Crude protein</td>
<td>15.0</td>
<td>16.5</td>
<td>18.7</td>
<td>21.0</td>
<td>23.7</td>
<td>26.1</td>
</tr>
<tr>
<td>DIP</td>
<td>9.9</td>
<td>9.3</td>
<td>9.2</td>
<td>9.2</td>
<td>9.5</td>
<td>9.4</td>
</tr>
</tbody>
</table>
# Animal Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>0</th>
<th>15</th>
<th>30</th>
<th>45</th>
<th>60</th>
<th>75</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMI, lb</td>
<td>16.4</td>
<td>17.0</td>
<td>16.7</td>
<td>16.5</td>
<td>16.4</td>
<td>15.5</td>
<td>0.12</td>
</tr>
<tr>
<td>ADG, lb(^1,2)</td>
<td>2.2</td>
<td>2.4</td>
<td>2.2</td>
<td>2.1</td>
<td>2.1</td>
<td>1.9</td>
<td>0.19</td>
</tr>
<tr>
<td>Feed:Gain(^1)</td>
<td>7.46</td>
<td>7.25</td>
<td>7.58</td>
<td>7.87</td>
<td>8.00</td>
<td>8.26</td>
<td>0.22</td>
</tr>
</tbody>
</table>

\(^1\)Linear (\(P < 0.05\))

\(^2\)Quadratic (\(P < 0.05\))
# Carcass Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>0</th>
<th>15</th>
<th>30</th>
<th>45</th>
<th>60</th>
<th>75</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass Wt, lb$^{1,2}$</td>
<td>680</td>
<td>695</td>
<td>680</td>
<td>669</td>
<td>667</td>
<td>646</td>
<td>6.16</td>
</tr>
<tr>
<td>Choice or higher, %</td>
<td>88</td>
<td>90</td>
<td>92</td>
<td>81</td>
<td>75</td>
<td>71</td>
<td>5.8</td>
</tr>
<tr>
<td>Yield grade 4 &amp; 5, %</td>
<td>10</td>
<td>22</td>
<td>22</td>
<td>21</td>
<td>24</td>
<td>18</td>
<td>7.2</td>
</tr>
</tbody>
</table>

$^1$Linear ($P < 0.05$)  
$^2$Quadratic ($P < 0.05$)
• Animal performance was optimized at 15%

• Feeding more than 30% corn DDGS decreased performance and carcass quality
Optimal Level of Sorghum WDGS

- 0, 8, 16, 24, 32, and 40% sorghum WDGS
- 4 pens / treatment
- 23 to 26 heifers / pen
- 58 DOF
## Experimental Diets

<table>
<thead>
<tr>
<th>Ingredient, %</th>
<th>0</th>
<th>8</th>
<th>16</th>
<th>24</th>
<th>32</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flaked corn</td>
<td>84</td>
<td>77</td>
<td>70</td>
<td>64</td>
<td>56</td>
<td>48</td>
</tr>
<tr>
<td>Sorghum WDGS</td>
<td>-</td>
<td>8</td>
<td>16</td>
<td>24</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>3.4</td>
<td>2.4</td>
<td>1.3</td>
<td>0.7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Urea</td>
<td>1.2</td>
<td>0.8</td>
<td>0.5</td>
<td>0.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Supplement</td>
<td>4.4</td>
<td>4.8</td>
<td>5.2</td>
<td>4.2</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Crude protein</td>
<td>15.3</td>
<td>15.6</td>
<td>16.0</td>
<td>16.3</td>
<td>17.6</td>
<td>19.5</td>
</tr>
<tr>
<td>DIP</td>
<td>9.3</td>
<td>8.7</td>
<td>8.3</td>
<td>7.8</td>
<td>8.1</td>
<td>8.9</td>
</tr>
</tbody>
</table>
## Animal Performance

### Sorghum WDGS, %

<table>
<thead>
<tr>
<th>Item</th>
<th>0</th>
<th>8</th>
<th>16</th>
<th>24</th>
<th>32</th>
<th>40</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMI, lb(^1)</td>
<td>19.0</td>
<td>20.2</td>
<td>18.9</td>
<td>19.2</td>
<td>18.8</td>
<td>18.3</td>
<td>0.28</td>
</tr>
<tr>
<td>ADG, lb(^{1,2})</td>
<td>2.8</td>
<td>3.1</td>
<td>3.1</td>
<td>2.9</td>
<td>2.7</td>
<td>2.6</td>
<td>0.09</td>
</tr>
<tr>
<td>Feed:Gain(^{1,2})</td>
<td>6.8</td>
<td>6.5</td>
<td>6.2</td>
<td>6.6</td>
<td>7.0</td>
<td>7.2</td>
<td>0.18</td>
</tr>
</tbody>
</table>

\(^1\) Linear (\(P < 0.05\))

\(^2\) Quadratic (\(P < 0.05\))
# Carcass Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>0</th>
<th>8</th>
<th>16</th>
<th>24</th>
<th>32</th>
<th>40</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass Wt, lb</td>
<td>641</td>
<td>653</td>
<td>651</td>
<td>645</td>
<td>638</td>
<td>632</td>
<td>7.3</td>
</tr>
<tr>
<td>USDA YG(^1)</td>
<td>1.8</td>
<td>2.1</td>
<td>1.9</td>
<td>2.2</td>
<td>2.0</td>
<td>2.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Choice or higher, %</td>
<td>34</td>
<td>49</td>
<td>34</td>
<td>56</td>
<td>35</td>
<td>53</td>
<td>5.7</td>
</tr>
</tbody>
</table>

\(^1\)Linear (\(P < 0.05\))
Key Points

- Animal performance was optimized at 16%

- Carcass weight decreased and USDA Yield Grade increased with higher levels of WDGS
Evaluation of 15% dried or wet distiller’s grains with solubles
Materials and Methods

- **Treatments**
  - Control
  - Sorghum dry DGS
  - Sorghum wet DGS
  - Corn dry DGS
  - Corn wet DGS

- 7 pens / treatment
- 5 to 7 steers / pen
- 114 DOF
## Experimental Diets

<table>
<thead>
<tr>
<th>Ingredient, %</th>
<th>Control</th>
<th>Sorghum</th>
<th>Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dry</td>
<td>Wet</td>
</tr>
<tr>
<td>Flaked corn</td>
<td>81</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Distiller’s grains</td>
<td>-</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>CSB</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Urea</td>
<td>1</td>
<td>-</td>
<td>0.6</td>
</tr>
<tr>
<td>Supplement</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Crude protein</td>
<td>14.0</td>
<td>15.2</td>
<td>14.8</td>
</tr>
<tr>
<td>DIP</td>
<td>10.7</td>
<td>8.0</td>
<td>8.9</td>
</tr>
</tbody>
</table>
## Animal Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>Sorghum</th>
<th>Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dry</td>
<td>Wet</td>
<td>Dry</td>
</tr>
<tr>
<td>DMI, lb</td>
<td>20.6</td>
<td>21.1</td>
<td>20.7</td>
</tr>
<tr>
<td>ADG, lb</td>
<td>3.2</td>
<td>3.1</td>
<td>3.0</td>
</tr>
<tr>
<td>Feed:Gain</td>
<td>6.49</td>
<td>6.77</td>
<td>6.80</td>
</tr>
</tbody>
</table>
## Diet Digestibility

<table>
<thead>
<tr>
<th>Digestibility, %</th>
<th>Control</th>
<th>Sorghum Dry</th>
<th>Sorghum Wet</th>
<th>Corn Dry</th>
<th>Corn Wet</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry matter</td>
<td>84&lt;sup&gt;a&lt;/sup&gt;</td>
<td>83&lt;sup&gt;a&lt;/sup&gt;</td>
<td>80&lt;sup&gt;b&lt;/sup&gt;</td>
<td>81&lt;sup&gt;a&lt;/sup&gt;</td>
<td>82&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.9</td>
</tr>
<tr>
<td>Organic matter</td>
<td>87&lt;sup&gt;a&lt;/sup&gt;</td>
<td>85&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>83&lt;sup&gt;b&lt;/sup&gt;</td>
<td>84&lt;sup&gt;b&lt;/sup&gt;</td>
<td>85&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>0.9</td>
</tr>
</tbody>
</table>

<sup>ab</sup>Means within a row without common superscripts are different ($P < 0.05$)
## Carcass Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>Sorghum Dry</th>
<th>Sorghum Wet</th>
<th>Corn Dry</th>
<th>Corn Wet</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass wt, lb</td>
<td>734</td>
<td>731</td>
<td>725</td>
<td>729</td>
<td>727</td>
<td>15.6</td>
</tr>
<tr>
<td>12th-rib fat, in</td>
<td>0.45</td>
<td>0.50</td>
<td>0.47</td>
<td>0.44</td>
<td>0.49</td>
<td>0.03</td>
</tr>
<tr>
<td>USDA yield grade</td>
<td>2.3</td>
<td>2.5</td>
<td>2.5</td>
<td>2.3</td>
<td>2.5</td>
<td>0.12</td>
</tr>
<tr>
<td>Choice or better, %</td>
<td>81</td>
<td>76</td>
<td>70</td>
<td>79</td>
<td>74</td>
<td>0.05</td>
</tr>
</tbody>
</table>
Key Points

- No difference in animal performance and carcass characteristics
  - 0 = 15% DGS
  - Wet DGS = Dry DGS
- 3% reduction in diet digestibility for DGS diets
Animal performance and carcass characteristics of yearling heifers fed 25% Corn WDGS
Materials and Methods

- 0 or 25% Corn WDGS
- 27 pens / treatment
- 6 to 7 heifers / pen
- 150 DOF
## Experimental Diets

<table>
<thead>
<tr>
<th>Ingredient, %</th>
<th>Corn WDGS, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Flaked corn</td>
<td>85</td>
</tr>
<tr>
<td>Corn WDGS</td>
<td>-</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>6</td>
</tr>
<tr>
<td>Corn steep</td>
<td></td>
</tr>
<tr>
<td>liquor</td>
<td>5</td>
</tr>
<tr>
<td>Urea</td>
<td>1</td>
</tr>
<tr>
<td>Supplement</td>
<td>3</td>
</tr>
<tr>
<td>Crude protein</td>
<td>14.0</td>
</tr>
<tr>
<td>DIP</td>
<td>7.5</td>
</tr>
</tbody>
</table>
# Animal Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>0</th>
<th>25</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMI, lb</td>
<td>17.4</td>
<td>17.2</td>
<td>-</td>
</tr>
<tr>
<td>ADG, lb</td>
<td>2.9</td>
<td>2.6</td>
<td>-9.0&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Feed:Gain</td>
<td>6.05</td>
<td>6.51</td>
<td>-7.9&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>P < 0.05
## Carcass Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>0</th>
<th>25</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass wt, lb</td>
<td>692</td>
<td>669</td>
<td>-3.4&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Ribeye area, in&lt;sup&gt;2&lt;/sup&gt;</td>
<td>12.4</td>
<td>12.0</td>
<td>-3.3&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>USDA yield grade</td>
<td>2.7</td>
<td>2.7</td>
<td>-</td>
</tr>
<tr>
<td>Choice or better, %</td>
<td>76</td>
<td>65</td>
<td>-16.9&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>P < 0.05
Key Points

- Reduced gains and efficiency by 8 to 9%
- 3% reduction in carcass weight and ribeye area
- 17% reduction in Choice or better carcasses
Evaluation of roughage level:
0 vs. 6% alfalfa hay
Materials and Methods

- **Treatments**
  - Sorghum dry DGS
    - 0% alfalfa hay
    - 6% alfalfa hay
  - Sorghum wet DGS
    - 0% alfalfa hay
    - 6% alfalfa hay

- 7 pens / treatment
- 5 to 7 steers / pen
- 114 DOF
## Experimental Diets

<table>
<thead>
<tr>
<th>Ingredient, %</th>
<th>0%</th>
<th>6%</th>
<th>0%</th>
<th>6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF</td>
<td>Hay</td>
<td>Hay</td>
<td>Hay</td>
<td>Hay</td>
</tr>
<tr>
<td>Flaked corn</td>
<td>76</td>
<td>70</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>Distiller’s grains</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>CSB</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>Urea</td>
<td>-</td>
<td>-</td>
<td>0.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Supplement</td>
<td>4</td>
<td>4</td>
<td>4.2</td>
<td>3.4</td>
</tr>
<tr>
<td>Crude protein</td>
<td>14.6</td>
<td>15.2</td>
<td>14.8</td>
<td>14.8</td>
</tr>
<tr>
<td>DIP</td>
<td>7.3</td>
<td>8.0</td>
<td>8.8</td>
<td>8.9</td>
</tr>
</tbody>
</table>
## Animal Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Sorghum DDGS</th>
<th>Sorghum WDGS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0% Hay</td>
<td>6% Hay</td>
</tr>
<tr>
<td>DMI, lb</td>
<td>19.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>21.1&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>ADG, lb</td>
<td>2.7&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.1&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Feed:Gain</td>
<td>7.06&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.77&lt;sup&gt;ab&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>ab</sup>Means within a row without common superscripts are different (\(P < 0.05\))
## Diet Digestibility

<table>
<thead>
<tr>
<th>Digestibility, %</th>
<th>Sorghum DDGS</th>
<th>Sorghum WDGS</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Hay Dry matter</td>
<td>84&lt;sup&gt;cd&lt;/sup&gt;</td>
<td>83&lt;sup&gt;abc&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Organic matter</td>
<td>86&lt;sup&gt;b&lt;/sup&gt;</td>
<td>85&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>86&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>abcd</sup>Means within a row without common superscripts are different (P < 0.05)
Carcass Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Sorghum DDGS</th>
<th>Sorghum WDGS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0% Hay</td>
<td>6% Hay</td>
</tr>
<tr>
<td>Carcass wt, lb</td>
<td>698&lt;sup&gt;a&lt;/sup&gt;</td>
<td>731&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>12&lt;sup&gt;th&lt;/sup&gt;-rib fat, in</td>
<td>0.43&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>0.50&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>USDA yield grade</td>
<td>2.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Choice or better, %</td>
<td>67</td>
<td>76</td>
</tr>
</tbody>
</table>

<sup>ab</sup>Means within a row without common superscripts are different (P < 0.05)
Key Points

- Steers fed 0% alfalfa had reduced intakes and gains
- Feed efficiency was not different
- 6% alfalfa reduced diet digestibility by 4%
- Carcass weight and yield grade was lower for steers fed 0% alfalfa
Future of ethanol production?
<table>
<thead>
<tr>
<th>Item</th>
<th>TRAD</th>
<th>FRAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry matter</td>
<td>87</td>
<td>90</td>
</tr>
<tr>
<td>Crude protein</td>
<td>26</td>
<td>43</td>
</tr>
<tr>
<td>Crude fat</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Neutral detergent fiber</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.81</td>
<td>0.44</td>
</tr>
<tr>
<td>Bulk density, lb/bu</td>
<td>40</td>
<td>47</td>
</tr>
<tr>
<td>Particle size, Dgw</td>
<td>415</td>
<td>1167</td>
</tr>
</tbody>
</table>
Materials and Methods

- Treatments
  - Control
  - Traditional DDGS
  - DDGS from fractionation process
- 8 pens / treatment
- 25 to 26 heifers / pen
- 118 DOF
<table>
<thead>
<tr>
<th>Ingredient, %</th>
<th>Control</th>
<th>TRAD</th>
<th>FRAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flaked corn</td>
<td>81</td>
<td>71</td>
<td>72</td>
</tr>
<tr>
<td>Corn DDGS</td>
<td>-</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>CSB</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Urea</td>
<td>1.2</td>
<td>0.7</td>
<td>-</td>
</tr>
<tr>
<td>Supplement</td>
<td>3.8</td>
<td>4.3</td>
<td>4.0</td>
</tr>
<tr>
<td>Crude protein</td>
<td>14.7</td>
<td>14.1</td>
<td>13.1</td>
</tr>
<tr>
<td>DIP</td>
<td>9.6</td>
<td>8.3</td>
<td>6.8</td>
</tr>
</tbody>
</table>
# Animal Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>TRAD</th>
<th>FRAC</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMI, lb</td>
<td>20.1&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>20.7&lt;sup&gt;a&lt;/sup&gt;</td>
<td>19.7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.35</td>
</tr>
<tr>
<td>ADG, lb</td>
<td>2.6</td>
<td>2.6</td>
<td>2.4</td>
<td>0.07</td>
</tr>
<tr>
<td>Feed:Gain</td>
<td>7.89</td>
<td>7.93</td>
<td>8.08</td>
<td>0.13</td>
</tr>
</tbody>
</table>

<sup>ab</sup>Means within a row without common superscripts are different (<i>P < 0.05</i>)
Dry Matter Digestibility

Digestibility, %

Control  TRAD  FRAC

75
72
72

abMeans within a row without common superscripts are different (P < 0.05)
# Carcass Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>TRAD</th>
<th>FRAC</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass wt, lb</td>
<td>677</td>
<td>681</td>
<td>669</td>
<td>9.39</td>
</tr>
<tr>
<td>12(^{th})-rib fat, in</td>
<td>0.32</td>
<td>0.35</td>
<td>0.32</td>
<td>0.02</td>
</tr>
<tr>
<td>USDA yield grade</td>
<td>1.8</td>
<td>1.9</td>
<td>1.8</td>
<td>0.08</td>
</tr>
<tr>
<td>Choice or better, %</td>
<td>41</td>
<td>47</td>
<td>44</td>
<td>3.01</td>
</tr>
</tbody>
</table>
Key Points

- Animal performance and carcass characteristics were not different
  - 0% = 13% Corn DDGS
  - Traditional = Fractionation

- DDGS reduced diet digestibility by 4%

- Lower P with DDGS from Fractionation Process
Summary of Topics:

- 15% DGS optimal for SFC diets
- Corn DGS = Sorghum DGS
- Dry DGS = Wet DGS
- Possible to decrease roughage
- Fractionation decreases P excretion
Questions?