Update on Corn and Corn Grain Use on Dairy Farms

Florida/Georgia Corn Silage and Forage Field Day

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Extension Dairy Specialist

University of Illinois Extension
Today’s Program

• Shredlage processed corn silage

• Snaplage as a high moisture corn

• Evaluating starch use in dairy cows

• Your questions and concerns
Shredlaje
Update
Shredlage: What Is It?

- Longitudinally ripped forage (increase surface area)
- Stalk pieces about the size of an alfalfa steam (1.25 inch TLC or 30 mm)
- Rhine of plant completely opened up.
- Smashed corn kernels
- Seems softer and fluffier.
Materials resulted from water separation technique done by Kevin Shinners, UW Madison, BSE
### Penn State Separator Box
(as-fed basis)

<table>
<thead>
<tr>
<th>Screen, mm</th>
<th>Shredlage</th>
<th>KP</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>31.5%</td>
<td>5.6%</td>
</tr>
<tr>
<td>8</td>
<td>41.5%</td>
<td>75.6%</td>
</tr>
<tr>
<td>1.18</td>
<td>26.2%</td>
<td>18.4%</td>
</tr>
<tr>
<td>Pan</td>
<td>0.8%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Samples obtained during feed-out from the silo bags

Luiz Ferraretto & Randy Shaver Dairy Science Department,
## Component-Corrected Milk Yields

<table>
<thead>
<tr>
<th>Component</th>
<th>Shredlage</th>
<th>KP</th>
<th>P &lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5% FCM, lb/d</td>
<td>100.1</td>
<td>97.8</td>
<td>0.07</td>
</tr>
<tr>
<td>FCM/DMI</td>
<td>1.77</td>
<td>1.79</td>
<td>0.65</td>
</tr>
<tr>
<td>ECM, lb/d</td>
<td>99.2</td>
<td>97.2</td>
<td>0.10</td>
</tr>
<tr>
<td>ECM/DMI</td>
<td>1.76</td>
<td>1.77</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Luiz Ferraretto & Randy Shaver Dairy Science Department, UW Madison
3.5% FCM Yield by Week

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shredlage</strong></td>
<td>100.1</td>
<td>101</td>
<td>99.4</td>
<td>99.8</td>
</tr>
<tr>
<td><strong>KP</strong></td>
<td>100.9</td>
<td>98.1</td>
<td>96.9</td>
<td>95.4</td>
</tr>
</tbody>
</table>

**Week × Treatment Interaction** ($P < 0.03$)
Wisconsin Farm Shredlage

Top: 44%

Middle: 27%

Bottom: 29%
Top: 44%
Middle: 27%
2012 Illinois Winning Corn Silage Sample (Conventional Processed)

Top: 63g  13.3%
Middle: 326g  68.8%
Bottom: 85g  17.9%
Top Box: 13.3%
Bottom Box: 17.9%
# Penn State Separator

<table>
<thead>
<tr>
<th></th>
<th>Top</th>
<th>2nd</th>
<th>3rd</th>
<th>Bottom</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMR</td>
<td>10-15</td>
<td>&gt; 40</td>
<td>&lt; 30</td>
<td>&lt; 20</td>
</tr>
<tr>
<td>Haylage</td>
<td>&gt; 40</td>
<td>&gt; 40</td>
<td>&lt; 20</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>Corn silage</td>
<td>5-15</td>
<td>&gt; 50</td>
<td>&lt; 30</td>
<td>&lt; 5</td>
</tr>
</tbody>
</table>

*Processing: (3/4 TLC-Process)*
Snaplage Alternatives
Snaplage Alternative

- Includes ear, husk, and parts of the plant
- Contain 25% NDF and 50 to 60% starch
- Increase yield by 15 to 25% dry matter / acre
- 80 to 90% energy value of shelled corn
- Harvest at 40 to 45% dry matter (at black layer)
- Inoculate with L. buchneri
<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Shelled</th>
<th>Ear</th>
<th>Snaplage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry matter</td>
<td>28-32</td>
<td>32-36</td>
<td>38-45</td>
</tr>
<tr>
<td>Starch</td>
<td>70-72</td>
<td>60-65</td>
<td>50-60</td>
</tr>
<tr>
<td>NDF</td>
<td>9</td>
<td>20</td>
<td>16-23</td>
</tr>
<tr>
<td>Protein</td>
<td>10</td>
<td>8</td>
<td>8-10</td>
</tr>
</tbody>
</table>
Management Considerations

• Starch is rapidly fermented due to the higher moisture content
• Cob and plant portion has 60% value of corn (value of grass forage)
• May need to add dry corn or barley
  – Reach desired ration starch levels
  – Slow down the rate of starch degradation
• Monitor milk fat test and dry matter intake
Fecal Evaluation
Evaluating Manure

• Fecal starch analysis
  – Measuring total tract starch utilization
  – Economic loss in milk yield

• Manure washing
  – Physical presence of feed particles
  – Forage quality evaluation

• Manure scoring
  – Cow responses - sorting, days in milk, pen evaluation
Apparent digestibility of feed starch and fecal starch (%DM)

\[ y = -0.0176x + 0.9872 \]

\[ R^2 = 0.7345 \]
<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starch dig (%)</td>
<td>84.6</td>
<td>7.0</td>
<td>70-96</td>
</tr>
<tr>
<td>Fecal starch (%)</td>
<td>6.0</td>
<td>1.6</td>
<td>3.9 - 9.9</td>
</tr>
<tr>
<td>Fecal lignin (%)</td>
<td>7.2</td>
<td>4.4</td>
<td>3.7 - 19.2</td>
</tr>
<tr>
<td>Fecal NDF(%)</td>
<td>55.5</td>
<td>4.1</td>
<td>14.0 - 30.3</td>
</tr>
<tr>
<td>Feed starch (%)</td>
<td>22.4</td>
<td>2.0</td>
<td>19.9 - 26.4</td>
</tr>
<tr>
<td>Feed NDF (%)</td>
<td>32.6</td>
<td>1.6</td>
<td>29.8 - 34.8</td>
</tr>
<tr>
<td>Feed lignin (%)</td>
<td>3.4</td>
<td>0.4</td>
<td>2.5 - 4.1</td>
</tr>
</tbody>
</table>
Milk response

- Fecal starch should be less than 4.5% represents total tract apparent digestibility of 90+ percent.
- If fecal starch can be reduced 1 unit (absolute decrease from 10% to 9%), milk production could increase 0.67 pound (dry matter intake remains constant).
WASHING MANURE

- Use a number 6 or 8 screen
- Evaluate a cup of manure
- Use pressurized water
- Cows to evaluate
  - dry cows
  - fresh cows
  - high cows
  - high producing 1st lact cows
  - various groups of cows
MANURE SCREENING

• Rumen
  – Passage of split soybeans
  – Presence of whole cottonseed

• Processing
  – Appearance whole soybeans
  – Presence of whole corn seed
  – Presence of forage particles over 1/2”

• Combination of rumen and processing
  – Appearance of starch in corn seed
CONSISTENCY

• Score 1  Thin, fluid, arcs, green
  – Example: sick cow, off feed, cows on pasture
• Score 2  Loose, splatters, little form
  – Example: fresh cow, cows on pasture
• Score 3  Stacks up 1 to 1 1/2 inches, dimples, 2 to 4 concentric rings, sticks to boot
  – Example: Recommended
• Score 4  Stacks up 2 to 3 inches, dry
  – Example: Dry cow, low protein, high fiber
• Score 5  Stacks up over 3 inches
  – Example: All forage, sick cow
Manure Score: 2
Manure Score: 3
Manure Score: 4.0
Manure Score: 5
**MANURE CHANGES**

<table>
<thead>
<tr>
<th>Stage of lactation</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry cow</td>
<td>3.5</td>
</tr>
<tr>
<td>Close up dry cow</td>
<td>3.0</td>
</tr>
<tr>
<td>Fresh cows</td>
<td>2.5</td>
</tr>
<tr>
<td>High cows</td>
<td>3.0</td>
</tr>
<tr>
<td>Late lactation cows</td>
<td>3.5</td>
</tr>
</tbody>
</table>
MANURE/FEED FACTORS

- Excess degradable or soluble protein  Lower
- Excess total protein or RUP  Lower
- High levels of fiber/forage  Higher
- Excessive starch/grain  Lower
- Lack of effective NDF  Lower
- Excess minerals  Lower
Evaluating Manure Scores

- High groups
  - < 5% at 1
  - < 20% at 2
  - > 80% at 3

- Low groups
  - No score 1
  - <10% at 2
  - >90% at 3
Take Home Messages

- Shredlage may be an alternative to replace hay and long forage particles.
- Snaplage will be an attractive alternative for some dairy managers.
- Monitor starch utilization including fecal and *invitro* analysis.