Considerations for Using Distillers Grains in Dairy Cattle Rations

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Distillers Grains

- A feed that has been used in ruminant rations for 100+ years
- Earliest research report was from Finland in 1893?
- Henry & Morrison – 1920
  “This rather bulky feed is one of the best high-protein concentrates for dairy cows, from 2 to 4 lbs. per head daily being usually fed”
### “Typical” Composition

<table>
<thead>
<tr>
<th>Item</th>
<th>DDG</th>
<th>DDGS</th>
<th>CDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP, %</td>
<td>29.5</td>
<td>29.6</td>
<td>29.8</td>
</tr>
<tr>
<td>Fiber, %</td>
<td>12.8</td>
<td>9.0</td>
<td>4.2</td>
</tr>
<tr>
<td>Fat, %</td>
<td>8.0</td>
<td>9.0</td>
<td>8.4</td>
</tr>
<tr>
<td>Ca, %</td>
<td>0.1</td>
<td>0.15</td>
<td>0.3</td>
</tr>
<tr>
<td>P, %</td>
<td>0.37</td>
<td>0.71</td>
<td>1.3</td>
</tr>
</tbody>
</table>
Northeast Feed Industry

- Has been a major user of DDGS for many years
- Primarily from the beverage industry
- Lots of variation in nutrient content of DDGS (between & within plants)
- Importance of ADICP level and impact on potential milk production
## DDGS Composition

<table>
<thead>
<tr>
<th>Item</th>
<th>D-1 Ave.</th>
<th>SD</th>
<th>Minn. Ave</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP, %</td>
<td>30.3</td>
<td>2.93</td>
<td>30.9</td>
<td>1.4</td>
</tr>
<tr>
<td>Sol-CP, %</td>
<td>14.7</td>
<td>5.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADI CP, %</td>
<td>4.55</td>
<td>2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fat, %</td>
<td>12.97</td>
<td>2.93</td>
<td>10.7</td>
<td>1.75</td>
</tr>
<tr>
<td>P, %</td>
<td>0.92</td>
<td>0.15</td>
<td>0.75</td>
<td>0.14</td>
</tr>
</tbody>
</table>
What Does DDGS Bring to the Table?

- Medium CP, low soluble CP, high RUP
- Low lysine
- Medium fat level (high linoleic)
- Medium NDF – good fiber digestibility
- Low lignin and starch
- High P
- High energy
How Does DDGS Match Cow Needs?

% of diet req't

CP  RUP  Lys  Meth  NDF  Fat  P  NE-l
Amino Acids, % of CP

![Graph showing the percentage of amino acids in different sources.]

- DBG
- Blood
- Dist
- SBM
- Milk
- MCP

Legend:
- Meth
- Lys
What’s DDGS Worth?

- Used current NE feed prices
- Used 3 different approaches
- Distillers grains were worth $130 – 160/ton
- Current prices are $115 – 130/ton
- DDGS are a good feed buy!
How Much DDGS Can We Feed?

- Will depend heavily on the forages and other feeds available or in the ration
- ADI CP
- P
- Amino acids
- Unsaturated fat levels
CPM-Dairy Runs

- Used the optimizer
- 1450 lb. cow, 90 lbs. milk
- Current NE feed prices
- Alfalfa silage = 17% CP, 43% NDF
- 60:40 CS:AS, 58% forage
- 60:40 AS:CS, 50% forage
CPM-Dairy Runs -2

- Initial run had no constraints for P and amino acids
- P restricted to max of 100% of NRC
- Methionine and lysine set at a minimum of 90% of requirement
CPM-Dairy Runs - Results

- High corn silage rations – 1 to 6 lbs of DDGS were pulled into the ration

- High alfalfa silage rations – 0 to 4 lbs of DDGS were pulled into the ration
ADICP Considerations

- Average ADICP from Dairy One samples is 15% of total CP.
- Average + 1 sd is 22% of CP.
- Samples with ADICP > 30% of CP do exist.
- Milk production loss from higher ADICP levels may be 1 – 4 lbs/day.
High ADI CP levels also decrease RDP and increase RUP (but the extra RUP may not be available in the animal)

High ADI CP levels are related to the drying process

Price should be adjusted for ADI CP

What are ADI CP levels in ethanol DDGS?
Lysine Considerations

- All corn products are low in lysine
- As ADICP levels increase, lysine availability decreases
- A bypass lysine source is currently not available
- Will need a high lysine feed (blood meal) to complement DDGS
The concern is high levels of linoleic acid (18:2) which is an unsaturated FA. High 18:2 levels can be related to milk fat depression via CLA. Low rumen pH accentuates this problem.
# Linoleic in Feeds

<table>
<thead>
<tr>
<th>Feed</th>
<th>Fat, %</th>
<th>% 18:2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn grain</td>
<td>4</td>
<td>55</td>
</tr>
<tr>
<td>DDGS</td>
<td>8 – 14</td>
<td>55</td>
</tr>
<tr>
<td>WCS</td>
<td>18 – 20</td>
<td>56</td>
</tr>
<tr>
<td>Roasted SB</td>
<td>18 – 20</td>
<td>52</td>
</tr>
<tr>
<td>Brewers grain</td>
<td>8</td>
<td>49</td>
</tr>
</tbody>
</table>
P Considerations

- DDGS is a high P feed
- Use will be limited in CAFO farms
- Most of the P is in the CDS
- Are there ways to lower or segregate the P from the CDS to produce a lower P DDGS?
Feed Industry

- They are going to “preferred” suppliers
- Will select products (like DFGS) based on quality, consistency and price
- They have data on composition and variability by source (specific plant, etc.)
Summary

- DDGS is an economical protein source for use in dairy cattle rations
- Actual quantity fed will be determined by protein needs, P, ADI CP, amino acids and FA levels
- Ethanol distillers database should include ADI CP information
Summary - 2

- As more information becomes available, the FA levels in rations will become a more limiting factor.
- At present, a practical guideline for NE dairy rations is that DDGS feeding levels will be < 10% of the total ration DM.
- This is 5 lbs/day for a cow consuming 50 lbs. of DMI.
- Will be less in many farm situations.
Questions?
Products

- DDG – Distillers Dried Grains – Nutrients remaining after starch is fermented to ethanol
- DDGS – Distillers Dried Grains + Solubles (at least 75% of the solubles)
- CDS – Condensed distillers solubles – The thin stillage that is condensed