Should Livestock Producers Receive Environmental Credits for Using Food Processing Byproducts in Rations?

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Overview:

- USDA-EPA has implemented nutrient management regulations for CAFO units
- New York state has also implemented regulations (but with fewer AU’s)
- Intent is to minimize the potential for N and P to affect water quality
What’s on the Horizon?

• 1. The number of AU’s to define a CAFO will be reduced (by end of 2002)
• P based standards will be more important
• By 2008-9, all livestock units will have to have nutrient management plans
• Odor, air quality and air particulate matter regulations will be implemented
Current View

• Efforts and regulations are focused on the individual farm unit
• What about a more global view?
Whole Farm Phosphorus Mass Balance

Imported P

Farm Boundary

Exported P

Feed

Fertilizer

Bedding

Animals

P remaining on farm

Run off

Leaching

P losses to water

Milk

Crops

Animals

Manure

P. Cerosaletti
What Can be Done?

• The N and P balance on an individual farm can be reduced by 20-40% by:
  
  1. Feeding more farm produced feed

  • Example: P balance on dairy farms
    
    • NY herds = +60 - 80%
    • WI herd = +40 - 60 %
What Can be Done - 2?

- Feeding higher quality forage
- Balancing closer to NRC requirements
- Selecting against feeds supplements with high P contents (but what do we do with these?)
Phosphorus Reductions Through Feed Management

Precision Feed Management

Precision Feeding

Comprehensive Forage Management

P. Cerosaletti
Simplified Phosphorus Cycle of the Dairy Farm

- Purchased Feed
- Intervene
- Milk
- Intervene
- Farm boundary
- Crops
- Soils
- Manure
- Fertilizer

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What’s the Challenge?

• The New York and Northeast feed industry is built upon the use of byproduct ingredients from the food processing industry

• New York is a grain deficit state

• We don’t produce enough corn and soybeans to feed our animals
What’s the Challenge - 2?

- NY = 700,000 dairy cows
- 2000 = 47 million bushels of grain corn
- 2000 = 4.4 million bushels of soybeans
- **IF** all the corn & soybeans were fed to dairy cows **only**
- Corn = 10 lbs/cow/day
- Soybeans = 1 lb/cow/day
What Does This Mean?

• If we are going to have livestock in New York, we have to rely on imported feed ingredients
• Many of these are from the food processing industry
• Many of the have P contents in excess of the NRC nutrient density guidelines
### Where Do They Come From?

<table>
<thead>
<tr>
<th>Industry</th>
<th>Products</th>
<th>ByProducts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn dry milling</td>
<td>Alcohol</td>
<td>Distillers grains</td>
</tr>
<tr>
<td>Corn wet milling</td>
<td>Sweeteners, starch</td>
<td>Gluten feed &amp; meal</td>
</tr>
<tr>
<td>Wheat milling</td>
<td>Flour</td>
<td>Wheat bran &amp; midds</td>
</tr>
<tr>
<td>Bakery</td>
<td>Bread, cookies, etc.</td>
<td>Bakery byproducts</td>
</tr>
<tr>
<td>Industry</td>
<td>Product</td>
<td>Byproduct</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Fish Oils, fish</td>
<td>Oils, fish</td>
<td>Fish meal</td>
</tr>
<tr>
<td>Fish Rendering</td>
<td>Meat</td>
<td>Blood meal, meat &amp; bone meal</td>
</tr>
<tr>
<td>Dairy</td>
<td>Cheese</td>
<td>Whey</td>
</tr>
<tr>
<td>Brewing</td>
<td>Beer</td>
<td>Brewers grains</td>
</tr>
<tr>
<td>Vegetables</td>
<td>Vegetables</td>
<td>Wet residues</td>
</tr>
</tbody>
</table>
Corn Milling - 100 lbs. of Corn

- 67 lbs. of starch & sweeteners
- 5.3 lbs. of corn gluten meal
- 12.2 lbs. of corn gluten feed
- 3.3 lbs. of corn germ meal
- 7.1 lbs. of condensed fermented corn extractives
Beer Brewing

- 33 lbs of wet brewers grains are produced per barrel of beer produced
- 1 barrel = 31 gallons
- In 2000, about 176 million barrels of beer
- About 3 million tons of wet brewers grains
- In NY are produced in Rochester, Utica and Syracuse
Rendering Industry

- Processes about 100 million hogs, 35 million cattle and 8 billion chickens/year
- About 50% of the live animal weight is used for food
- Renderers also pick up about 100 million pounds of other residual materials (used oil from McDonald’s etc.)
Rendering Industry - 2

- In 2000, about 52 billion pounds of animal byproducts were recycled into 18 billion pounds of rendered products used for animal feed.
- About 9 billion pounds each of tallow and meat & bone meal.
Distilling Industry - Alcohol Production

- Includes both beverage and fuel producers
- Ethanol production for fuel is increasing rapidly in the US
- Yield is 2.5 gallons of alcohol per bushel of corn
- About 10 lbs. of distillers grains & 6.7 lbs. of distillers solubles per bushel of corn
South Dakota currently has 4 ethanol plants. Several more are in development. Will be producing >200 million gallons of ethanol and 840,000 tons of distillers grains by 2003.
What is the P Content of These Byproduct Feeds?
## P Content of Forages

<table>
<thead>
<tr>
<th>Forage Type</th>
<th>P Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn grain</td>
<td>0.3% P</td>
</tr>
<tr>
<td>Corn silage</td>
<td>0.23 (.03)</td>
</tr>
<tr>
<td>Legume hay &amp; silage</td>
<td>0.26 – 0.32 (.06)</td>
</tr>
<tr>
<td>Legumes – Project 1</td>
<td>0.39 (.05)</td>
</tr>
<tr>
<td>Grass hay &amp; silage</td>
<td>0.24 – 0.31 (.07)</td>
</tr>
<tr>
<td>Grasses – Project 1</td>
<td>0.41 (.09)</td>
</tr>
</tbody>
</table>
Summary of Feed P Data

• There are few feeds with low P values to obtain ration P values in the range of the NRC requirements for lactating dairy cattle.

• Dry cows, heifers and beef animals will always have P intakes much higher than NRC requirements (they have lower requirements).

• There is not enough low P feed sources.
What Does This Mean?

• On an individual farm, it may be possible to balance a ration to meet the NRC nutrient requirement guidelines

• On a NY industry basis, this will be difficult since we need to use byproduct feeds with high P levels

• We have a challenge!!!!
What Are the Implications?

• If we do feed rations with P in excess of the NRC requirements:
  • 1. We need more acres/cow
  • 2. We will have to decrease cow numbers
  • 3. We will produce manure with a higher P content and thus more P to go back onto the land (if animal numbers don’t change)
Diet P & Acres Needed (USDA Dairy Forage Research Center)
P Excretion/Year - 100 Cow Herd

P, lbs/year

Ration P, %

0.31 0.36 0.41 0.46 0.51 0.56

60 lbs. milk
80 lbs. milk
What If We Don’t Use These Byproducts as Feed?

• Society has a major disposal problem!!
• Can these materials be spread on the land?
• Can they be burned?
• Can they be composted?
• Can they go into landfills?
What If We Don’t Use these Byproducts as Feed?

- The company producing them will have to raise the cost of the “primary” product to cover the cost of alternative disposal approaches.
- If they do this, will consumers purchase less?
- Will the company be profitable?
Where Do We Go?

• If we assume that utilization of these byproducts for animal feed is the best use from a total society point of view

• How do we balance this use versus some alterations in P balance on farms (will probably be higher)?
Where Do We Go?

- Could this mean that livestock producers should receive some type of “environmental credit” for using these to be applied towards their nutrient management plans?
- Do you have other options to suggest?
- Where do we go from here as a work group?
Questions?