Overview of Dietary Manipulation

Air Management Practices Assessment Tool (AMPAT)

Project Team:
- Jay Harmon, Prof. of Ag & Biosystems Engineering
- Steve Hoff, Professor of Ag & Biosystems Engineering
- Angie Rieck-Hinz, Extension Program Specialist

Application

- Used to reduce emissions from buildings and manure storage

Basic Operation

- Feed nutrients greatly impacts manure nutrient content
- Reduction in manure nutrient content reduces the potential for emissions
- Nutrient input reduction
- Nutrient form modification
Basic Operation

• An improvement of feed efficiency of 0.1 generally decrease nutrient excretion by 3.3 percent
  – The more efficient… The lower the emission potential

Phase/Split Sex Feeding

• Avoid providing excess nutrients
• Phase feeding throughout life cycle
  – Ammonia 45% reduction
  – Odors 55% reduction

Lowering Crude Protein

• Reduce crude protein 3.5 to 4.5%
• Supply amino acids using supplements
  – Ammonia 40-60% reduction
  – Hydrogen Sulfide 30-40% reduction
  – Odors 30-40% reduction
Adding Fermentable Carbs

- Soybean hulls, wheat bran or midds or sugar beet pulp
- Changes how nitrogen is excreted (more in feces rather than urine)
- 10% SB hulls and 3.4% fat
  - Ammonia 20% reduction
  - Hydrogen sulfide 32% reduction
  - Odor 11% reduction

Feed Manufacturing

- Particle size – 650 to 750 microns
  - Reduced nitrogen excreted 20 to 24%
- Pelleting or Fat
  - Reduces dust
- Liquid feeding
  - Reduced odors 23 to 31%

Other

- Feed wastage
  - Adds nutrients directly to manure
  - Increase bacterial activity
- Water
  - High sulfur can impact H2S emission
Dietary Manipulation - Pros

• Easily implemented when done in consultation with a nutritionist
• Many options impact multiple emitters
• Changes may cost very little

Dietary Manipulation - Cons

• Additive and feedstuff availability and costs may fluctuate
• Nutritional needs change as the pig grows and may lead to more complex feed choices.

Effectiveness

<table>
<thead>
<tr>
<th>Component</th>
<th>Reduction</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH3</td>
<td>30-50%</td>
<td></td>
</tr>
<tr>
<td>H2S</td>
<td>30-50%</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>20-50%</td>
<td></td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>50 to 80%</td>
<td></td>
</tr>
<tr>
<td>Volatile Organic Compounds (VOC)</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>$</td>
<td></td>
</tr>
</tbody>
</table>

Varies greatly with option selected.
For Further Information:

• National Pork Board

• If you are an educator and wish to have copies of powerpoint files, contact Jay Harmon (jharmon@iastate.edu).