Thank you for participating in PorkBridge 2011-12.

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Quality Control When Using Alternative Ingredients

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National Swine Nutrition Guide

- Swine Feed & Ingredient Sampling and Analysis. Factsheet #23.
- Purchasing High Quality Feedstuffs for Swine. Factsheet #25

"Normals" for Corn

Source: USDA, WF Ag Economics

Feed cost per pig marketed

Source: USDA, WF Ag Economics

Courtesy Dr. Bob Goodband, KSU
• Not only a new paradigm for ingredient costs, but also a new paradigm for complexity of swine diets

• Will be using multiple feed ingredients at lower inclusion levels to get required nutrient profile
  – As you increase number of feedstuffs in a diet, you decrease the impact of product variability

• Will look a lot more like European diets

• Have to be better nutritionists

Two Sources of New Ingredients

• Alternate Feedstuffs
  – A normal or intact seed

• By-products and/or co-products
  – The result of a manufacturing process
  – Increased variability

By-Products

Dry Milling Process

Effect of Processing Method on DDGS Quality

Low Quality, Less Digestible DDGS ???:

High Quality, Highly Digestible DDGS
Dry Milling Process

Corn → Ground → Cooked → Liquification → Fermentation → Distilled → Thin Stillage → Condensed Solubles → Ethanol

- Alpha amylase
- Yeast & gluco-amylase
- CO2

Specifications for DDGS for Swine Diets

- Moisture: maximum of 12%
- Crude protein: minimum of 26.5%
- Crude fat: minimum of 10%
- Crude fiber: maximum of 7.5%
- Calculated Lysine:Protein ratio of >2.80%
- Color: golden (but darker DDGS may not be bad)
- Smell: fresh, fermented, pleasant cereal odor
- Bulk density: 34-37 lb/cubic foot
- Particle size:
  - coarse = 10% max on 2000 mesh screen
  - fine = 15% max on 600 mesh screen & pan

Not All DDGS IS Created Equal

- Variation between & within current plants
- Plants using phosphoric acid instead of sulfuric acid
- De-Oiled DDGS

<table>
<thead>
<tr>
<th></th>
<th>Traditional</th>
<th>De-Oiled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Matter</td>
<td>88%</td>
<td>87.7%</td>
</tr>
<tr>
<td>Crude Protein</td>
<td>&gt; 26.5%</td>
<td>31.2%</td>
</tr>
<tr>
<td>Crude Fat</td>
<td>&gt;10.0%</td>
<td>4.00%</td>
</tr>
</tbody>
</table>

What in the heck is that stuff???

Analyzing a Feedstuff

- Where do you send it?
- What does it cost?
- What do you ask for?
- How do you do it?
- What do you do with the results?

Laboratory Services

- Private & university labs
- Contact before sending a sample in:
  - Types of analyses
  - Cost
  - Sample size preferred
  - Time to get results
  - Duplicate samples
Costs of Assays

Examples
- Sample handling - $5
- Sample prep - $10
- Proximate Analysis - $75
- Lysine - $50
- Phosphorus - $25
- Mycotoxins - $50 each
- NDSU Diagnostic Lab - $90 for full screen

Minimum Analyses for Feedstuffs

- Grain
  - Moisture
  - Protein
  - Test weight
  - Mycotoxin screen if conditions warrant it

Minimum Analyses for Feedstuffs

- By-Products
  - Moisture
  - Crude protein
  - Lysine
  - Fat
  - Fiber
  - Phosphorus
  - Mycotoxin screen if conditions warrant it

Sampling

- Garbage In – Garbage Out!!!!

- Use the proper tools

- Have a clean 5 gallon bucket to collect samples

- Little mistakes in sampling can have a major influence on the results you get back

Bagged Ingredients

- Use a bag trier
- 1’ diameter, double tube w/out compartments
- Slot is ¾” in width
- Lay bags horizontally & remove core sample end to end
- Minimum of 10 bags
- Each sample is ½ lb

Bulk Ingredients

- Grain probe
  - 1 3/8” diameter & 5’ to 6’ in length
  - Without compartments
  - 4 to 6 evenly spaced locations in the truck
• Bulk Ingredients
  • Pelican sampler
    – Container 18” long, 2” wide, & 6” deep with handle
    – Sampling from an unloading stream
    – At least 10 samples from equal intervals of the stream
    – From start to end

Sample Reduction
  • The combined samples are too much to send in
  • Need a representative sub-sample
  • “Quartering” is a classic method
    1. Thoroughly mix the composite sample
    2. Spread the composite sample out on a clean, flat surface in an even layer
    3. Divide into quarters
    4. Take 2 opposite quarters, mix & repeat if necessary to obtain two, 1 to 1.5 lb samples

Sample Reduction
  • Samples put in clearly marked containers
    – Permanent marker
    – Date of sampling
    – Ingredient type
    – Who sampled
    – Any other pertinent information

Sample Reduction
  • Heavy plastic containers
  • Durable bags
  • Paper or cloth sacks when testing mycotoxins
  • Send 1 sample in and put the other sample in a freezer

How Often Do I Sample?
  • What kind of problems are you expecting?
  • How long do the lab assays take?
  • Time available for sampling
  • Quality control standards of supplier
Interpreting Results

• Just because results don’t match what was expected doesn’t mean it’s an inferior product
• Natural errors/variation in lab procedures
• Each nutrient will have its own acceptable level of variation

Questions to Ask BEFORE Feeding By-Products

• Are there added costs of using the by-product?
  – Transportation
  – Storage
  – Anti-oxidants
  – Processing
  – Labor
  – Equipment wear and tear
• Who’s in charge of quality control
  – Time & $
  – Cost of feed & ingredient analyses generally range from $.25 to $3.00/ton of finished feed
  – Can’t rely on reference tables

Questions to Ask BEFORE Feeding By-Products

• Is there animal or human health hazards associated with the by-product?
  – Toxic substances
  – Salmonella
  – Mycotoxins
  – Anti-growth factors
• Is nutrient composition suited to swine?
  – Nutrient availability
  – Nutrient density
  – Palatability

Questions to Ask BEFORE Feeding By-Products

• Do you have open bin space or what are you going to get rid of?
• How long is product available at lower price?
• Any special handling, grinding, storage issues?
Questions to Ask **BEFORE** Feeding By-Products

- How variable is the product?
- Trucking costs?
- Affects on growth performance & carcass?

Questions to Ask **BEFORE** Feeding By-Products

- Does it reduce cost of production most of the time?
  - Needs to be a long-term advantage
- Is by-product availability & quality sufficiently consistent to support longtime use?

Questions to Ask **BEFORE** Feeding By-Products

- Does it affect pelleting?
- Does its bulk density create problems with storage and transportation?
- What are the salt & sugar levels?

Summary

- The new *NORMAL* will be using multiple feed ingredients in a corn-SBM based diet
- By-products can be excellent feedstuffs but are variable in nature
- New ingredients require chemical analyses
- Proper sampling techniques are critical
- Some variation in results are normal

Summary

- Other factors besides price and nutrient concentrations need to be considered before choosing an alternate feedstuff
- Will it work in *YOUR* system?
Thank You