Livestock and Poultry Environmental Learning Center Webinar Series

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Manure Holding Pond Sampling To Address Crop Nutrient and Water Quality Protection Concerns

An Overview Of Concepts And Options

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What Determines Manure Rates?

- Land area?
- Crop nutrient needs?
- Nutrient Management Plan?
- Available Equipment?
- Manure Volume?
- Manure N,P,K Concentrations?
- Economics?
- Available time/labor?
- Neighbor’s noses?
- Climate/Weather?
- Soil nutrient supplies?
- Facilities Design?
- Personal preferences?
- Target crop production?
- Water quality concerns?
- Regulations?
- Economics?

Setting Rates, Juggling Act

Manure Characteristics

Varies with:
- Animal population
- Pre excretion practices
- Post excretion practices

Both Physical and Chemical

The archived presentation is available at:
https://articles.extension.org/pages/21819/chronological-webcast-archive
Example Nutrient Results When Swine Holding Pond is Sampled At Different Depths

<table>
<thead>
<tr>
<th>Units are % or lb/1000 gal</th>
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</thead>
<tbody>
<tr>
<td>% Solids</td>
</tr>
<tr>
<td>Top Water (4:1:4)</td>
</tr>
<tr>
<td>Entire Column (2:1:1)</td>
</tr>
<tr>
<td>Settled Solids (3:5:1)</td>
</tr>
</tbody>
</table>

Key Sampling Concepts

- At times “book values” can’t be avoided
- Sampling recommended
- Sample to get meaningful values
- Sampling options
  - Before application
  - During application
- Know why you’re sampling
  - Nutrients in storage unit
  - Nutrient concentration of application

Can’t Forget Bio-Security

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Knowledge Needed For Sampling

- Management practices for storage units
- Manure traits in storage unit
- Beneficial use and/or disposal concerns
- The purpose of sampling
  - Total nutrients in storage?
  - Concentration of application?
- Sampling Time
  - Before Application?
  - During Application?

Focus For This Discussion

- Sampling holding ponds to address
  - Crop nutrient needs
    - Determined by test recommendations
  - Water quality protection concerns
    - Prevent over application N & P
    - Elevated soil P levels
    - Proper use of P Index
- Sampling for NMP
  - Development
  - Refinement

Earthen Storages X Sections

Holding Pond
- Free Board
- 25 yr 24 hr storm
- Precipitation
- Manure Storage
- Settled Solids
- Routine Removal Volume
- Long Term Storage Volume

Lagoon
- Free Board
- 25 yr 24 hr storm
- Precipitation
- Manure Storage
- Treatment
- Settled Solids
Holding Pond Management

- No water here
- Pumped ASAP
- Routine Removal
- Volume Options
  - Agitate & pump
  - Pump some top water then pump

Pond Sampling Pointers

- If Pond Will Be Agitated Collect Samples From Top, Middle, and Bottom of Pond Then Blend
- Otherwise Collect Sample From Zone You Will Be Pumping

Pond Sampling

- 8+ sub-samples collected from pond and blended for composite sample
- Advantages:
  - Results can be used for future application
- Disadvantages:
  - Can’t be used for current application
  - Can be difficult to collect samples that represent manure being applied
Manure Sample Processing

- Mix several sub-samples for composite sample
- Fill sample jar 1/2 full
- Get sample to extension office same day or keep cool
- Have correct analysis done

Sampler Options

![Sampler Options Diagram]

- Wooden pole (10 feet)
- Plastic container (5 gallons)
- Clean Out Dowel (1-inch diameter PVC Pipe)
- PVC Pipe (2-inch diameter, 6 feet long)
- Plastic Container (5 gallons)
- Rubber Ball
  2 1/4-inch diameter
Sampler Options

Parting Concept

Perfect sampling is the unachievable goal. Good sampling is the journey.