Overview of Land Application Methods

Air Management Practices Assessment Tool (AMPAT)

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Application
- Used during the land application of manure to cropland to reduce emission of gases and odors.

Basic Operation
- Manure application is important in supplying crop nutrients
- Up to 1/3 of the total ammonia emission may occur during manure application
- Odor potential is great during transport and application

Land Application
- Broadcasting
  - Used with slurry or solid
  - Surface applied
  - Great emission and odor potential
  - Incorporation with tillage operation within 24 hours can reduce emission from 20 to 90%

Land Application
- Injection
  - Tanker or Umbilical System
  - 90% reduction in ammonia and odors over broadcasting
  - Odor similar to un-manured tilled ground

Land Application
- Injection
  - Options include chisel shanks, sweeps, shallow disks or narrow knives.
  - More power required but more nutrients saved.
Land Application

• Injection
  – Retention of crop residue cover is important.
  – End rows can be a source of odors if surface spillage occurs. Can also be a source of over-fertilization.

• Irrigation
  – Very high emission and odor potential.
  – Low trajectory guns or drop-nozzles recommended.
  – Avoid if other options exist.

Land Application Methods- Pros

• Potential to reduce odors and emissions
• Injection and incorporation can conserve nutrients.

Land Application Methods- Cons

• Soil disturbance can potentially increase erosion.
• Requires more horsepower for injection or incorporation.
• Costs may be greater for injection versus broadcast applications.

Effectiveness

<table>
<thead>
<tr>
<th>Component</th>
<th>Reduction</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH3</td>
<td>20 to 90%</td>
<td>Depending on injection vs incorporation days application</td>
</tr>
<tr>
<td>H2S</td>
<td>50 to 75%</td>
<td>estimated</td>
</tr>
<tr>
<td>Odor</td>
<td>50 to 75%</td>
<td></td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>Unreported</td>
<td></td>
</tr>
<tr>
<td>Volatile Organic Compounds (VOC)</td>
<td>Unreported</td>
<td></td>
</tr>
<tr>
<td>Greenhouse Gas</td>
<td>-10%</td>
<td>Slight increase in N2O in injection</td>
</tr>
<tr>
<td>Cost</td>
<td>$-5-$5</td>
<td>Equipment and fuel</td>
</tr>
</tbody>
</table>

For Further Information:

• eXension
• National Pork Board

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