In-Field Stockpiling of Poultry Litter

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THE ISSUES

• Temporary field storage is common in the Delmarva Region
• Is there a basis for requiring covering of litter after 14 days in the field?
• Local growers suggest covering with poly is not very practical
• Current Delaware policy allows uncovered piles for up to 150 days if certain procedures are followed
**Current Level of Knowledge**

- No information on nutrient losses from “production-size” litter piles
- All previous information on nutrient losses is from small “research-size” piles
- Some previous studies have used poly under the research pile to collect runoff
- The DNMC et al. decided that information was needed on production-size litter piles
Objectives of this Work

• Determine the quantity and types of nutrients being lost from production-size piles
• Evaluate the impact of storage length (i.e., number of days) on nutrient losses
• Evaluate “alternative” methods of storage (i.e., something other than “nothing” or using a poly cover)
OBSERVATIONS
March 20, 2006

Total rain: 9.8”
DATA
Runoff
Ammonium-N (lbs) in 100’ x 18’

Mean = 16 lbs
Nitrate-N (lbs) in 100’ x 18’

Mean = 0.8 lbs
Mean = 0.3 lbs
Total P (mg P/liter)

- East
- West

Year 1
Total P (lbs) in 100’ x 18’

Mean = 3.5 lbs
Potassium (lbs) in 100’ x 18’

Mean = 113 lbs

Whatman #2
Total S (mg S/liter)

- East
- West

Year 1
Total S (lbs) in 100’ x 18’

Mean = 32 lbs
DATA

Soil
Loading to 3’ Depth

Assumed Pile Size: 100 ft X 18 ft

Days Pile was in Place

Inorganic Nitrogen (lb of N)

Year 1
Loading to 4’ Depth

Assumed Pile Size: 100 ft X 18 ft

Days Pile was in Place:
- 35
- 48
- 118
- 141
- 159
- 195

Inorganic Nitrogen (lb of N)

Year 2
Loading to 3’ Depth

Assumed Pile Size: 100 ft X 18 ft

<table>
<thead>
<tr>
<th>Type of Cover or Base</th>
<th>Inorganic Nitrogen (lb of N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>17</td>
</tr>
<tr>
<td>Poly</td>
<td>23</td>
</tr>
<tr>
<td>BC</td>
<td>16</td>
</tr>
<tr>
<td>SC1</td>
<td>17</td>
</tr>
<tr>
<td>SC2</td>
<td>19</td>
</tr>
<tr>
<td>SD</td>
<td>16</td>
</tr>
<tr>
<td>PG</td>
<td>15</td>
</tr>
</tbody>
</table>

Year 1
POLY vs NO COVER (4 Reps)

Assumed Pile Size: 100 ft X 18 ft

Type of Cover

- None
- Poly

Inorganic Nitrogen (lb of N)

Piles in place for at least 120 days

3 Years/4 sites
Range in Values Across All Sites

Assumed Pile Size: 100 ft X 18 ft

- **Min**: 2.0
- **Max**: 29.1
- **Mean**: 12.2
- **Median**: 11.7
- **SD**: 6.7

*N = 31*

**Piles in place for at least 90 days**

**Pile would contain about 100 tons**
185-Day Treatment – 0 days

Soil Phosphorus (ppm M3-P)

- Under
- Edge
- Outside

0-6"
6-12"
195-Day Treatment – Day 0

Soil Potassium (ppm K)

- Under
- 2' Under
- Edge
- 2' Outside
- 20' Outside

0-6"
6-12"
No Cover – Day 0

Soluble Salts (mmhos/cm)

- Under
- Edge
- Outside

Legend:
- 0-6"
- 6-12"
Year 1
Salt = 0.0081N + 1.01
$R^2 = 0.02$

Year 1
Salt = 0.0053N + 1.16
$R^2 = 0.01$

Year 2
Salt = 0.0114N + 0.56
$R^2 = 0.14$

Year 2
Salt = -0.0002N + 0.91
$R^2 = 0.00$
Summary and Conclusions

• All spray-on covers didn’t provide a benefit and were sometimes worse
• Nutrients are being lost from poultry piles
• The nutrient being lost in the greatest amounts (about 8 times) is potassium
• Potassium concentrations are the main contributor to soluble salts concentrations
• Poly covers provided no benefit for N losses
• Nitrogen is lost from piles both as leachate (edges) and probably as ammonia gas
Summary and Conclusions

• Nitrogen is being lost from litter piles to the soil and because of limited to no plant growth is most likely being lost to the environment
• These amounts should be kept in perspective
• Piled litter has less potential for nutrient losses than litter spread at the “wrong time”
• Establishment of growing plants in these areas would reduce these potential losses
• Current regulations should be followed!!!
QUESTIONS???

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