Soils tests are essential to determine agronomic application rates for biosolids

RECYCLING
In Lincoln today, 100% of biosolids are recycled. By recycling biosolids, cooperating farmers are helping to extend the life of the Bluff Road Landfill by more than two years. The City of Lincoln is proud that its biosolids are of such high quality that they are in demand by area farmers as a soil enhancing fertilizer.

For more information on Lincoln's Treatment process and Biosolids visit the following Web sites:

lincoln.ne.gov (keyword: wastewater)
lancaster.unl.edu/enviro/waste
epa.gov/owm/mtb/biosolids

The City of Lincoln Wastewater Division and UNL Extension in Lancaster County continually strive to improve the biosolids program. For more information about this program, contact Gene Hanlon, Lincoln Wastewater and Solid Waste Operations Division (441-7043) or Cooperative Extension in Lancaster County (441-7180).

Interested in a tour of Lincoln's Wastewater Treatment Facilities? Contact Randy Wilson, Lincoln Wastewater System, at 441-7961.

Randy Wilson, Superintendent of Lincoln's Wastewater Treatment Facilities (left), answers questions from farmers participating in the biosolids land application program.

LINCOLN'S BIOSOLIDS
LAND APPLICATION PROGRAM

WHAT ARE BIOSOLIDS?
Biosolids are nutrient-rich organic materials resulting from the treatment of domestic sewage from Lincoln's two wastewater treatment facilities. Through biosolids management, solid residue from wastewater treatment is processed to reduce pathogens and minimize odors, forming a safe, beneficial agricultural product. Biosolids can be applied as fertilizer to improve and maintain productive soils, stimulate plant growth and increase crop yields. Biosolids are carefully monitored and must be used in accordance with regulatory requirements.
**Nutrient Value**

Biosolids have all the nutrients to improve the health of soils and give plants what they need to grow. Most nitrogen in biosolids is organic nitrogen and becomes available for crop growth over several years. About 3 lbs. of nitrogen per cubic yard is available for crop growth the first year after application.

Most farmers in the biosolids program report that first-year yields increased 5 to 10% where biosolids were applied compared with commercial fertilizers. However, yield increases as high as 28.5% have been reported on excavated soils.

In addition, biosolids are about 60% organic matter. Soils with increased organic matter are healthy and more fertile, they hold water better and are less likely to erode.

**Nutrient and Fertilizer Value of Biosolids**

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>AMOUNT (lb/ton)</th>
<th>FERTILIZER COST ($/lb)</th>
<th>VALUE ($/ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>17.0</td>
<td>$0.26</td>
<td>$4.42</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>10.0</td>
<td>$0.26</td>
<td>2.60</td>
</tr>
<tr>
<td>Potassium</td>
<td>0.9</td>
<td>$0.24</td>
<td>0.22</td>
</tr>
<tr>
<td>Copper</td>
<td>0.3</td>
<td>$1.35</td>
<td>0.41</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.3</td>
<td>$1.21</td>
<td>0.17</td>
</tr>
<tr>
<td>Iron</td>
<td>3.6</td>
<td>$1.23</td>
<td>5.60</td>
</tr>
<tr>
<td>Sulfur</td>
<td>0.6</td>
<td>$0.22</td>
<td>0.79</td>
</tr>
</tbody>
</table>

**Total value per ton** $14.20

*2007 analysis and nutrient prices (wet-weight basis).

Applications for dryland corn are usually about 28 wet-tons per acre and represents a value of $397.60 per acre.

Source: UNL Agronomy & Horticulture Department

**Sound Science**

No other agricultural product or practice has been subjected to such rigorous scientific assessment and risk evaluation as biosolids recycling. Numerous scientists, regulatory agencies and academic institutions have conducted extensive research on the safety of biosolids, finding no harmful effects from the land application of biosolids on agricultural cropland.

**Careful Application**

Specific regulations guide biosolids handling and recycling on agricultural cropland. This includes processing requirements, laboratory analysis and documentation, site restrictions and setbacks from sensitive environmental features.

Applying biosolids is not a casual activity, but is carefully planned and executed. Application rates are determined by the concentration of nitrogen present in biosolids (from laboratory analysis), residual nitrogen in the top four feet of soil, and nitrogen requirements of the next crop grown. Manure spreaders are calibrated to ensure accurate application rates.

Odor sometimes occurs with biosolids. Most of the time biosolids have a distinctive, slightly musty odors caused by compounds such as sulfur and ammonia. Odors associated when biosolids are applied to cropland are usually noticeable for only a few days. Occasionally, when damp humid weather occurs, odors may linger. Farmers may sometimes be asked to incorporate biosolids into the soil soon after surface application to minimize odors.