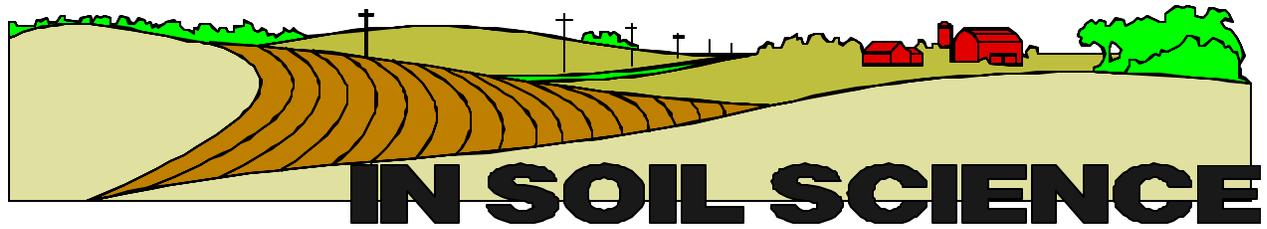


NEW HORIZONS



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Determining Biosolid Application Rates

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Basis for application rates

Chapter NR 204 regulates biosolid (sewage sludge) management in Wisconsin. It requires that University of Wisconsin-Extension recommendations be used to determine the rate of biosolid application. These recommendations incorporate countless research findings over decades and are routinely updated to include new information. UWEX recommendations are designed to balance agronomic, economic, and environmental considerations. Recommendations are written to permit users the opportunity to make informed decisions regarding this part of a crop production program.

Most biosolid application rates are based on the nitrogen (N) need of the crop, which in turn is determined by soil test results, soil type, and cropping management. Credits for legumes and manure, or previous biosolid applications must first be subtracted from the N rate recommended by the soil test.

Several municipalities have opted to use lime stabilization in their biosolid management process. Lime-stabilized biosolids are an excellent liming material and should be used as a substitute for aglime rather than N fertilizer. A soil test

report includes a lime recommendation that can be converted to an equivalent biosolid rate if the "neutralizing index" of the biosolid is known. Additional N from fertilizer or other sources may be needed for crops such as corn because of the lower N content and rate of application with these materials.

Biosolids and N availability

Most of the N in a biosolid is contained in an organic form. Once mineralized by microorganisms into a plant available form (ammonium), the fate of the N is similar to what it would have been had the N been applied as a fertilizer.

Biosolids are applied at a rate that will provide sufficient available N to the crop. This rate is based on the assumption that all the biosolid ammonium-N will be available in the year of application, assuming the material is incorporated shortly after application, and that 25% of the organic N will become plant available in the first year. NR 204 specifies that the remaining organic N from an initial application must be credited in the second and third year following application at a value of 12 and 6%, respectively.

Calculating application rate

Depending upon the treatment process, biosolids will either have a liquid or a semi-solid consistency. Liquid materials are pumped and their application rate is expressed in gallons/acre, whereas solid materials are spread much like animal manure with application rates expressed as tons/acre. Regardless of form, the dry matter content, and organic and mineral N content of the biosolid must be known.

A four-step worksheet is provided with an example for determining application rate. First record the biosolid analysis from a lab report; second determine the adjusted N rate after subtracting N credits from the soil test N recommendation; third calculate the first-year available N from the biosolid; and fourth determine the “as-is” application rate for the biosolid.