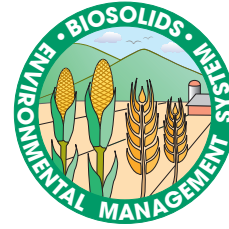


Biosolids Management Fact Sheet: Land Application



City of Los Angeles • Department of Public Works • Bureau of Sanitation



WHAT ARE BIOSOLIDS?

Biosolids are the nutrient-rich organic byproducts resulting from wastewater treatment. Biosolids are not raw human waste and do not include ash from incinerators, grit and screenings collected during preliminary treatment of wastewater, industrial residues, municipal solid waste, or hazardous waste. Biosolids can be in several forms including a liquid, a rich moist soil, a dried pellet, or compost.

WHERE DO BIOSOLIDS COME FROM?

Biosolids are created through the transformation of liquid and solid matter in wastewater using natural biological processes. This transformation involves physical, chemical, biological, and heat processes designed to remove water and reduce the levels of odor and bacteria. The City uses anaerobic digestion to produce Class A biosolids, which contain little or no pathogens.

WHAT ARE THE BENEFITS OF APPLYING BIOSOLIDS TO LAND?

Land application of biosolids is an excellent way to recycle wastewater solids as long as the material is quality-controlled. Biosolids are beneficially used as a soil amendment, fertilizer, or to produce a compost product. Biosolids supply valuable nutrients to the soil, enhance conditions for crop growth, and replenish soil organic matter. The application of biosolids to soil serves several purposes. It improves soil properties, such as texture and water holding capacity, which make conditions more favorable for root growth and increases the drought tolerance of the crops, thus reducing the amount of water needed to irrigate the crops. Biosolids application also supplies nutrients essential for plant growth such as nickel, zinc, and copper. Biosolids can also serve as an alternative or substitute for expensive chemical fertilizers. The nutrients in the biosolids offer several advantages over those in inorganic fertilizers because they are organic and are released slowly to growing plants. These organic forms of nutrients are less water soluble and, therefore, less likely to leach into groundwater or run-off into surface waters. Land application is relatively an inexpensive option and capital investment is generally lower.



IS RECYCLING BIOSOLIDS TO LAND SAFE?

Yes! Long-term scientific studies have repeatedly demonstrated that biosolids recycling is safe. After many years of research, testing of stabilization methods, and scientific review the Environmental Protection Agency's 40 CFR Part 503, Standard for the Use and Disposal of Sewage Sludge Part 503 was promulgated to ensure that recycling of biosolids is safe. The Part 503 Rule requires that wastewater solids be processed before they are land applied. This processing is referred to as "stabilization" and helps minimize odor generation, destroys pathogens (disease causing organisms), and reduces vector attraction potential. There are several methods to stabilize wastewater solids, including: Adjustment of pH or alkaline stabilization, digestion, composting and heat drying. The City stabilizes its biosolids using the anaerobic digestion process. In addition to stabilization, the Part 503 Rule sets a ceiling concentration for eight metals which cannot be exceeded in biosolids that will



be land applied, cumulative pollutant loading rates which may not be exceeded at the land application sites, and pollutant concentrations. If ceiling and pollutant concentrations are not exceeded in the biosolids to be land applied, the cumulative pollutant loading rates do not need to be tracked. Monthly and quarterly testing is performed by the City and local county health department through the use of an independent laboratory to ensure that metal requirements are met.

The City produces an Exceptional Quality (EQ) biosolids. EQ biosolids meet the Class A pathogen reduction requirements, the most stringent metal limits (pollutant concentrations), and the vector attraction reduction standards specified in the Part 503 Rule. Class A biosolids have been treated to significantly reduce or eliminate pathogens. Pathogen reduction in the biosolids is confirmed through testing performed monthly and quarterly by the City and the local county health department. Vector Attraction Reduction (VAR) refers to processing which makes the biosolids less attractive to vectors (flies, mosquitoes, rodents, birds, etc). The City achieves VAR in its digestion process through the destruction of the volatile solids. The VAR is confirmed through monthly testing. Exceptional Quality biosolids products are as safe as other agricultural and horticultural products and may be used without site restriction.

Also other state and local regulations may be required for biosolids land application that provides additional protection for the public and the environment. The City currently complies with a local county ordinance to apply biosolids at its farm, Green Acres. The county ordinance is more stringent than the federal requirements and contains additional setback and management practices designed to protect public health, the environment and address local conditions. The City meets all federal, state, and local requirements governing biosolids land application and virtually all of the monitoring requirements are well below the established limits.

WHAT IS THE METHOD USED TO LAND APPLY THE BIOSOLIDS?

There are several methods to apply biosolids. The selection of the method depends on the type of land and the consistency of the biosolids. Liquid biosolids are essentially 94 to 97 percent water, can be injected into the soil, applied to the land surface, or incorporated into soil with conventional farm equipment. Contractors usually provide the necessary hauling and land application equipment, which saves municipalities lower management costs.

It is often economical to reduce the volume of biosolids prior to transportation or storage. The amount of biosolids can be reduced by removing water through mechanical

processes such as draining, pressing, or centrifuging, resulting in a material composed of up to 30 percent dry solids. Dewatered biosolids do not require any specialized equipment and can be applied with conventional agricultural equipment, such as manure spreaders pulled by a tractor, or by means of front loader to spread the biosolids followed by planner to distribute it evenly to the soil. The biosolids are usually incorporated into the soil by means of plowing or disking. The City incorporates its biosolids into the soil within 30 minutes to 6 hours after it is off-loaded at the farm. No biosolids are stockpiled at the site.

HOW DO YOU DETERMINE HOW MUCH BIOSOLIDS IS APPLIED?

The amount of biosolids that may be applied to the site is a function of the amount of nutrients required by the crops and the amount of metals found in the biosolids. The application of biosolids at agronomic rate can be calculated based on three variables – the amount of nitrogen required by plants or crops and soil (N requirement), the amount of nitrogen from biosolids (net plant-available N, or PAN), and the amount of N available from other sources (N credits). The nitrogen supplied from other sources refers to nitrogen from supplemental fertilizer, nitrogen from irrigation water and nitrogen from previous crops. In addition, nutrient content and physical characteristics, such as percent solids, are used to determine the appropriate application rate for the crop that will be grown and the soil in which the crops will be grown.

ARE THE BIOSOLIDS SAFE TO USE FOR GROWING CROPS?

Yes! Of all the major crop nutrients, nitrogen is often the most important determinant of plant growth and crop yield. Biosolids contain nitrogen and all other nutrients necessary for the plants to grow at fairly well balanced ratios compared to what crops need. Plant growth and crop yield usually increase when nitrogen is added, despite the presence of nitrogen in soils. If appropriate calculations are made and proper management practices are observed, biosolids can provide a viable means to enhance soil and crop nitrogen. Agronomic rates are calculated before crop planting and for each field that will receive biosolids.

WHERE CAN I OBTAIN INFORMATION ABOUT THE CITY'S BIOSOLIDS PROGRAM?

Information about the biosolids program can be obtained by contacting us at 310-648-5877 or visiting our website at <http://www.lacity.org/SAN/biosolidsems/index.htm>. Also if you would like a tour of the land application operations contact us at 310-648-5877.

