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# BIOSOLIDS: Frequently Asked Questions

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## **What are biosolids?**

Biosolids are mostly organic solids resulting from the treatment of wastewater that have undergone additional treatment to kill pathogens and that have been approved by the U.S. Environmental Protection Agency (EPA) for land application as a fertilizer and soil amendment. Biosolids are rich in such nutrients as nitrogen and phosphorus and contain other supplementary nutrients, including potassium, sulfur, magnesium, calcium, copper and zinc.

## **What are the different kinds of biosolids?**

The federal Clean Water Act Part 503 regulations identify two classes of pathogen reduction for biosolids:

Class B biosolids undergo a “Process to Significantly Reduce Pathogens” (PSRP). Digesters and other forms of treatment kill from 90 to 99.5 percent of the pathogens originally found in wastewater solids. This means that pathogens are reduced to levels that are well below those found in animal manures. As an added layer of public protection, additional best management practices (BMPs) are required at the site where biosolids are applied, such as buffers and restrictions on access immediately after application. The natural environment of sunlight and existing organisms in the soil break down remaining pathogens. In Virginia, Class B biosolids are used in bulk as fertilizers in agriculture and forestry and to reclaim barren lands. Site permits from the Virginia Department of Environmental Quality (DEQ) are required for Class B biosolids use.

Class A biosolids undergo a “Process to Further Reduce Pathogens (PFRP).” Pathogens are reduced to basically non-detectable levels. Class A biosolids products can be used on home lawns and gardens, parks and golf courses, and other places where public contact is likely without further regulation or site permits. Class A biosolids products include composted biosolids, lime pasteurized biosolids and fertilizer pellets. Class A biosolids products are sometimes ingredients in soil amendments, potting soils, and slow-release fertilizers available at lawn and garden centers.

## **How do we know that biosolids are safe?**

Long-term scientific studies have consistently demonstrated that biosolids recycling is safe and beneficial when performed in accordance with federal and Virginia regulations.

The management of biosolids to minimize environmental and health risks has been the focus of hundreds of university research studies conducted for many years. The results of this extensive research show that biosolids can be managed so that the risk of adverse effects to the environment or public health from land application of biosolids is extremely low.

## **Are there heavy metals in biosolids?**

Biosolids contain trace amounts of heavy metals, or “trace elements,” as do natural soils, manures and commercial fertilizers. These trace elements come from human wastes, household plumbing systems, household products, businesses and industries. The EPA thoroughly studied the potential risks from these trace elements and set strict maximum levels



in biosolids to protect public health and the environment. Because of required industrial pretreatment and the risk-based standards for biosolids recycling, the risks posed by trace elements in biosolids are minimal.

Many of the regulated elements in biosolids are beneficial in correct amounts. Chromium, copper, iron, manganese, selenium and zinc are micronutrients for plants, animals and humans (look at the contents of a multi-vitamin tablet). It is the presence of these micronutrients that accounts for the greater effectiveness of biosolids as fertilizer when compared to traditional chemical fertilizers.

### **How are biosolids protected from industrial chemicals?**

Certain industries create wastewater that contains unacceptable levels of chemicals or other pollutants. By federal law, these industries must pre-treat their wastewater before sending it to the community wastewater treatment facility. Pretreatment regulations were developed under the Clean Water Act. These regulations ban the discharge of any hazardous substance at rates that might:

- Harm wastewater treatment plant workers
- Damage sewers or hinder the wastewater treatment process
- Pass through the wastewater treatment plant and contaminate the plant's receiving waters, or
- Concentrate in the biosolids to levels of concern.

Localities set additional local standards for pollutants allowed in industrial discharges to their wastewater treatment facilities. The plants issue permits to certain industries within their service area, require certain industries to treat their wastewater before sending it to sewers, require testing and monitoring of discharges and conduct inspections and enforcement actions.

### **Can disease-causing organisms be spread through the air during biosolids land application?**

Science says no. Extensive studies to determine whether liquid biosolids could spread disease through the air were recently reported by researchers at the University of Arizona's Department of Microbiology and Immunology, and supported by the National Science Foundation Water Quality Center. Their conclusion: "...aerosolized microorganisms were not detectable during land application of liquid class B biosolids..."

### **Is Staph aureus transmitted by biosolids?**

The latest research says no. A study reported in 2003 by scientists at the University of Arizona in Tucson has produced convincing evidence that Staph aureus is not present in biosolids. The report appeared in the October 2003 issue of the *Journal of Environmental Science and Technology*.

### **Can biosolids harm our streams and groundwater?**

Federal and state regulations, agricultural best management practices and nature provide multiple layers of protection for our streams and groundwater. Studies also show that biosolids can help to reduce runoff into our streams and leaching into groundwater.



Virginia regulates how biosolids are applied in order to prevent runoff into streams or leaching into groundwater. Studies have demonstrated that biosolids applied according to current EPA and Virginia standards pose no risk to the Commonwealth's water.

### **Who regulates the generation and land application of biosolids in Virginia and how can I be sure they protect my health and the environment?**

The EPA and the Virginia Department of Environmental Quality (DEQ) enforce clearly defined regulations that are designed to protect human health and the environment.

The comprehensive regulatory program that exists today, which includes federal, state and local components, is based on decades of research that examined all aspects of protecting public health and the environment. These agencies maintain websites that provide an overview of their programs and describe the regulations that they administer.

Environmental Protection Agency: [www.epa.gov/OW-OWM.html/mtb/biosolids/index.htm](http://www.epa.gov/OW-OWM.html/mtb/biosolids/index.htm)  
Virginia Department of Environmental Quality: [www.deq.virginia.gov/vpa/landapp.html](http://www.deq.virginia.gov/vpa/landapp.html)

### **How do biosolids help soils and crops?**

Biosolids contain many essential plant nutrients, including the primary macronutrients nitrogen, phosphorus, and to a lesser extent, potassium. Biosolids supply these needed elements to plants much like commercial fertilizer.

### **How do other states and countries handle biosolids?**

The recycling of biosolids is a widespread and accepted practice throughout the United States and the world. According to the EPA, all 50 states have biosolids management programs. According to a United Nations report, the land application of biosolids is continuing to grow in Europe and the agricultural recycling of biosolids is in wide use throughout most western nations, including Canada and Australia.

### **How much land is receiving biosolids in Virginia?**

Less than about 6/10 of one percent of the available farm and forest land in Virginia receives biosolids each year, about 50,000 acres out of 8.6 acres. The amount of farm and forest land that is permitted for biosolids in Virginia is only 350,000 acres—about 4 percent of Virginia's farmland.

### **Where can I find more information about biosolids?**

Virginia Biosolids Council: [www.virginiabiosolids.com](http://www.virginiabiosolids.com)

The National Biosolids Partnership: [www.biosolids.org](http://www.biosolids.org)

Water Environment Research Foundation: [www.werf.org/humanhealth/biosolids\\_residuals.cfm](http://www.werf.org/humanhealth/biosolids_residuals.cfm)

The Mid-Atlantic Biosolids Association: [www.mabiosolids.org](http://www.mabiosolids.org)

