
BIOSOLIDS: QUESTIONS & ANSWERS

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Q. Is Staph aureus transmitted by biosolids?

A. The latest research says no.

Questions are often raised about whether disease-causing pathogens, such as *Staphylococcus aureus*, or Staph aureus, a pathogen found in raw sewage, remain in treated biosolids, with the potential for causing illness.

Biosolids are chemically and biologically different from raw sewage because they go through the same treatment processes received by the water that is released back into our streams and rivers, which must meet stringent EPA requirements for pathogens. Biosolids must receive even more treatment, such as aerobic or anaerobic digestion and/or lime stabilization, before being acceptable for land application.

A study reported in 2003 by scientists at the University of Arizona in Tucson produced convincing evidence that Staph aureus is not present in biosolids. The report appeared in the October 2003 issue of the *Journal Environmental Science and Technology*.

The Staph aureus study was led by Dr. Ian Pepper, a professor in the University of Arizona Department of Soil and Water Science and director of the UA National Science Foundation Water Quality Center.

Since no scientific data were available to document whether biosolids specifically contain Staph aureus, Pepper and his colleagues studied biosolids and bioaerosol samples from 15 separate sites across the United States.

The sample sites ranged from the East Coast to the Southwest, and all were full-scale treatment plants. The researchers took samples of raw sewage and untreated primary sewage sludge in sterile bottles and transported them on ice to their laboratory. They also collected biosolids samples at the production site and transported the samples on ice in sterile containers overnight to the laboratory. Each sample was assayed for Staph aureus the day it was received.

The researchers also collected bioaerosol samples from four sites in the southwestern United States using commercial land applicators of both “cake” and liquid biosolids. Cake biosolids have about 20 -30 percent solids, compared to liquid, which have about 6 percent solids. The scientists analyzed all bioaerosol samples for Staph aureus within 24 hours of collection. In all, the team analyzed three raw untreated sewage samples and two undigested primary sewage sludge samples, 23 different biosolids samples, and 27 aerosols obtained during biosolids land application (biosolids aerosols).

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“We detected Staph aureus in samples of raw sewage and undigested primary sewage sludge,” the scientists reported. “However, we did not detect Staph aureus in Class A or Class B biosolids after aerobic or anaerobic digestion, lime stabilization, heat-dry pelleting and/or composting.” These are conventional methods that wastewater treatment plants use to remove disease-causing organisms from raw sewage.

“You can find Staph aureus in sewage and you should be able to, because one in three people have it in their systems,” Pepper says. “Yet it should be noted that none of the biosolid or biosolid aerosol samples in our study were positive for Staph aureus. The most likely explanation is that wastewater treatment kills Staph aureus along with other pathogenic microbes.”

Pepper notes that allegations regarding the safety of biosolids are often not based on good science. “Overall we need more scientific studies to resolve potential issues of concern,” Pepper says. “Our study was science-based and indicates that biosolids are an unlikely source of Staph aureus.”

Sources:

News release from the University of Arizona, September 3, 2003.

“Evidence for the Absence of *Staphylococcus aureus* in Land Applied Biosolids,” *Environmental Science and Technology* 37 (18), 4027 -4030, 2003.

