U.S. Environmental Protection Agency
Office of Water

Office of Science & Technology
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Fact Sheet: A WERF Study Finds Fecal Coliforms Appear to Reactivate In Centrifuge Dewatered Solids at Four of Seven Facilities Tested

Background

The Water Environment Research Foundation (WERF) recently published a report titled *Examination of Reactivation and Regrowth of Fecal Coliforms in Centrifuge Dewatered, Anaerobically Digested Sludges*. WERF-sponsored researchers sampled seven full-scale publicly owned treatment facilities several times to determine if bacterial indicator organisms (e.g., fecal coliforms and *E. coli*) could become reactivated or if regrowth occurs after anaerobic digestion and high-solids centrifugation. Wastewater treatment facilities often use dewatering processes after anaerobic digestion to reduce the water content of sewage sludge thereby significantly reducing the volume and associated handling and transport costs. A high-solids centrifuge is a high-speed process that uses the force from rapid rotation of a cylindrical bowl to separate water from the wastewater solids.

Results from the WERF Study

Four out of seven facilities processing sewage sludge via anaerobic digesters and high-solids centrifuge dewatering demonstrated higher levels of fecal coliforms after dewatering than before. The other three facilities did not show an increase. Researchers theorize that some bacteria populations may enter a viable but non culturable (VBNC) state after prolonged stress experienced during anaerobic digestion and are not accurately measured by standard culturing methods. The high shear during high-solids centrifuge dewatering may release compounds that stimulate reactivation. Other possibilities include a change in environmental conditions or removal of bacterial growth inhibitors. The study did not identify all the conditions that caused dewatered biosolids from some plants to have reactivation while others did not.

Study Implications

The WERF study raises the possibility that in some site-specific situations reactivation following anaerobic digestion and centrifugation may be occurring. However, neither WERF nor EPA can assess how widespread this occurrence is because of the small sample size.

The information from this study may be useful for utilities that use anaerobic digestion in combination with high-solids centrifuge dewatering. The results can help utilities to determine whether similar increases in measured fecal coliform concentrations are observed following high-solids centrifuge dewatering at their facilities. Utilities can then determine if process design, operational modifications, or additional treatment, such as low dose lime addition to the sewage sludge cake, is needed to further reduce pathogen indicators.

Next Steps

These are important areas of research and warrant further study. A follow-up study by WERF is looking at both how the treatment processes and bacteria test methods could be contributing to an increase in the measured level of fecal coliforms following high-solids centrifuge dewatering. EPA will continue to evaluate this phenomenon in partnership with WERF through additional WERF-sponsored research projects and other research efforts. The results of these efforts should help develop a better understanding of this phenomenon. WERF is also proposing to expand the scope of this ongoing work and better explain the phenomenon.

When warranted by adequate data, EPA may provide updated technical guidance or propose appropriate amendments to Part 503 requirements relative to pathogen reduction technologies and pathogen bacteria or pathogen indicator monitoring techniques. The Agency continues to believe that the pathogen requirements and operational standards of Subpart D of the 40 CFR Part 503 regulations are protective of public health.

Further Information

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