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## WWTP Sludge Reduction

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### Agricultural applications offer municipal solutions and strategies

*Sludge management is a key factor in the design and operation of a variety of wastewater treatment systems. Municipal wastewater treatment plants (WWTPs) that use aerobic treatment processes (e.g., activated sludge) to stabilize wastewater produce clean water, which is discharged to the environment, and sludge, which needs to be dealt with as part of the treatment process.*



### Aerobic & Anaerobic Treatment Options

Broadly speaking, liquid waste can be biologically treated either aerobically or anaerobically. Aerobic systems employ oxygen to facilitate microorganisms to break down organic wastes into carbon dioxide and water. This approach, while efficient, can produce large amounts of sludge that are problematic and need further intervention.

In general, sludge is a combination of microbes and biomass that grows as it feeds on the large amount of energy available in the wastewater. Sludge takes up volume in wastewater treatment systems and periodically needs to be removed, resulting in increased operating costs and complexity.

Anaerobic systems, on the other hand, work in the absence of oxygen. They produce carbon dioxide, water and methane, which can be readily converted into energy. They also tend to produce less sludge than aerobic systems for a variety of reasons. One major factor is that the energy available in the wastewater is preserved in methane gas, resulting in a reduction in the energy available for the microorganisms to create biomass. This ultimately results in less sludge.

Aerobic treatment systems generally are used for lower-strength wastewater, such as residential and municipal wastewater. Anaerobic systems are employed for high-strength wastes, such as food wastes and animal manure.