THE TERAX® TECHNOLOGY MUNICIPAL BIOSOLIDS

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THE TERAX® WASTE CONVERSION TECHNOLOGY MUNICIPAL BIOSOLIDS

PROBLEM

Wastewater treatment plants produce a solid waste by-product typically known as biosolids. The amount produced is largely proportional to the volumes of wastewater being treated and levels of treatment required to meet increasingly stringent effluent discharge standards. Typically, 10-40 dry kilograms of biosolids are produced per person each year.

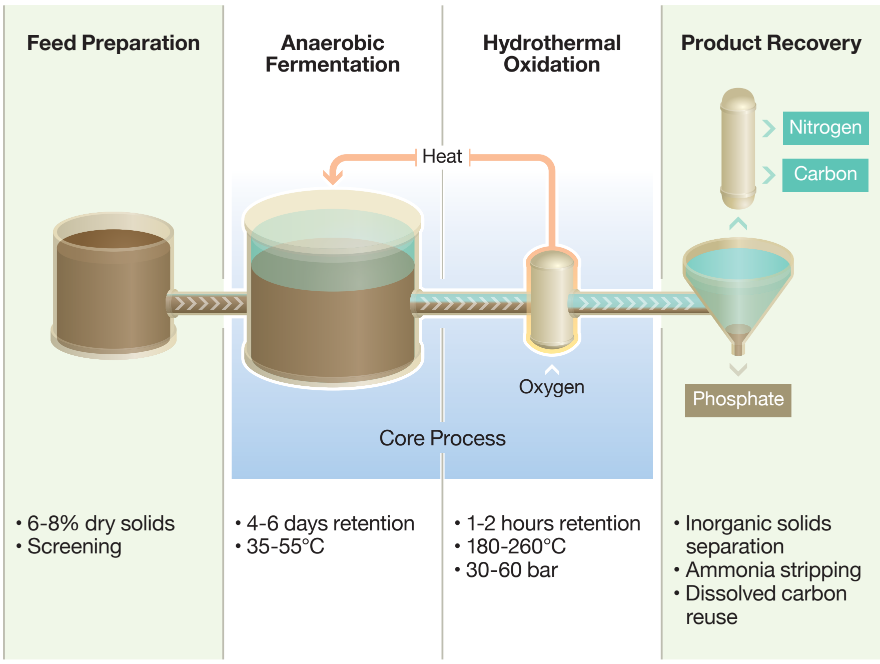
Biosolids management and disposal is an increasing global challenge for both urban and rural communities. Numerous technological approaches to reducing biosolids volumes typically result in final disposal to landfill or agricultural application. These challenges have resulted in rapidly increasing costs. This cost increase is commonly associated with;

- **Quantities** - most biosolids are 75-80% water. Due to landfill consolidation trends, these biosolids need to be transported over longer distances.
- **Contamination** - high pathogen and heavy metal concentrations require increasing levels of treatment, quality control, and reduced disposal options.
- **Environmental impacts** - significant nutrient levels contribute to waterway degradation and breakdown of organic matter to greenhouse gas emissions.

The TERAX® technology was developed to address the challenge of biosolids management to provide a cost-effective, and just as importantly, secure disposal route that is not subject to the risks currently burdening many wastewater treatment plants.

PROCESS

The core TERAX® technology comprises two stages. This hybrid anaerobic fermentation and hydrothermal oxidation process combines the strengths of biological and chemical approaches to waste treatment to achieve substantial solids destruction and chemical recovery.



The first stage of the core TERAX® technology is a short retention anaerobic fermentation targeting solids reduction and organic acid production. It achieves up to 40-50% solids reduction in four to six days residence time and with low energy requirements.

This is followed by a hydrothermal oxidation stage which completes the organic solids degradation. This stage generates additional short-chain organic acids (specifically acetic acid), ammonia, and a high phosphorus ash. It achieves greater than 90% reduction in organic solids. This stage is operated at sub-critical water temperatures and pressures resulting in reaction rates around a hundred times faster than the fermentation stage. This results in a short residence time of one to two hours.

95% reduction in organic solids volume

Chemical and **energy production** mean new markets and cost savings

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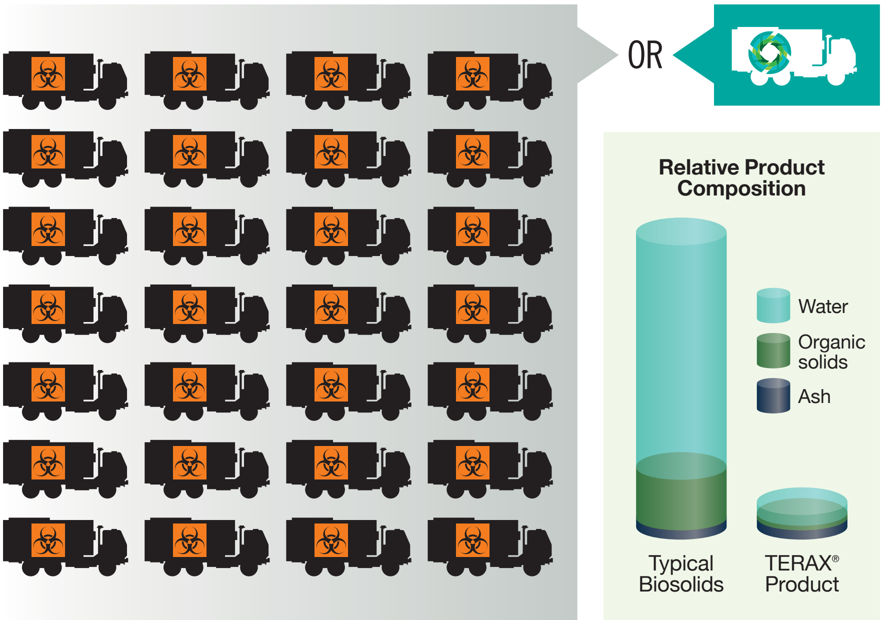
This hybrid approach couples the efficiency of the biological process with the effectiveness of the chemical process to achieve low operating costs and increase product recovery yields above that which could be achieved with either process alone.



The TERAX® process generates enough heat to sustain itself, making it more energy efficient than sludge incineration or drying. By virtually eliminating biosolids transport and disposal costs, this technology is more cost effective than digestion and other existing sludge treatment processes.

PRODUCTS

Dissolved carbon. The dissolved carbon produced as a result of the organic solids destruction is very biodegradable and can be used in biological nutrient removal processes. Traditionally, supplementary carbon has been used to achieve effective de-nitrification. Commercial carbon supplements such as methanol or ethanol can represent a large proportion of the treatment cost. They can be substituted with TERAX® liquor.

Alternatively, this carbon rich fraction can be used for biogas production for heat and power.

Nitrogen and phosphorous recovery. Nitrogen and phosphorus are readily separable as a result of the process and provide excellent recycling opportunities. More than 60% percent of the nitrogen and 90% of the phosphorus is recoverable, resulting in a reduced nutrient load returned to the wastewater treatment plant.

Nutrients are recovered through stripping ammonia and separating the ash. At about 30% phosphate content, this ash is comparable to rock phosphate used for fertiliser production.

Industrial biotechnology applications. Output chemicals may be used as building blocks for industrial biotechnology applications, such as bioplastics, biofuels, bioenergy, fertilisers, or for electricity production.

CONTACTS

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