CalPrex™

Pre-Digestion P-Recovery

Pilot test unit.

THE PROBLEM

Phosphorus Solubilization **Limits** Recovery Efficiency

Typical struvite based phosphorus recovery technologies recover only 15-30% of the phosphorus entering wastewater treatment plants (including Bio-P plants). Recoverable crystals are only available from soluble and reactive phosphorus (orthophosphate).

THE SOLUTION

Pre-fermentation: the Biological **Solution** for P Solubilization

A short fermentation step (12-36 hours) prior to the anaerobic digester provides a low-oxygen environment. This facilitates the rapid release of orthophosphates in Bio-P sludge along with the dissolution of crystallized and organically-bound phosphorus. Over 60% solubilization of P can occur during the fermentation without using any additional chemicals. In non-Bio-P plants, up to 40% of the phosphorus solubilizes using a fermentation step.

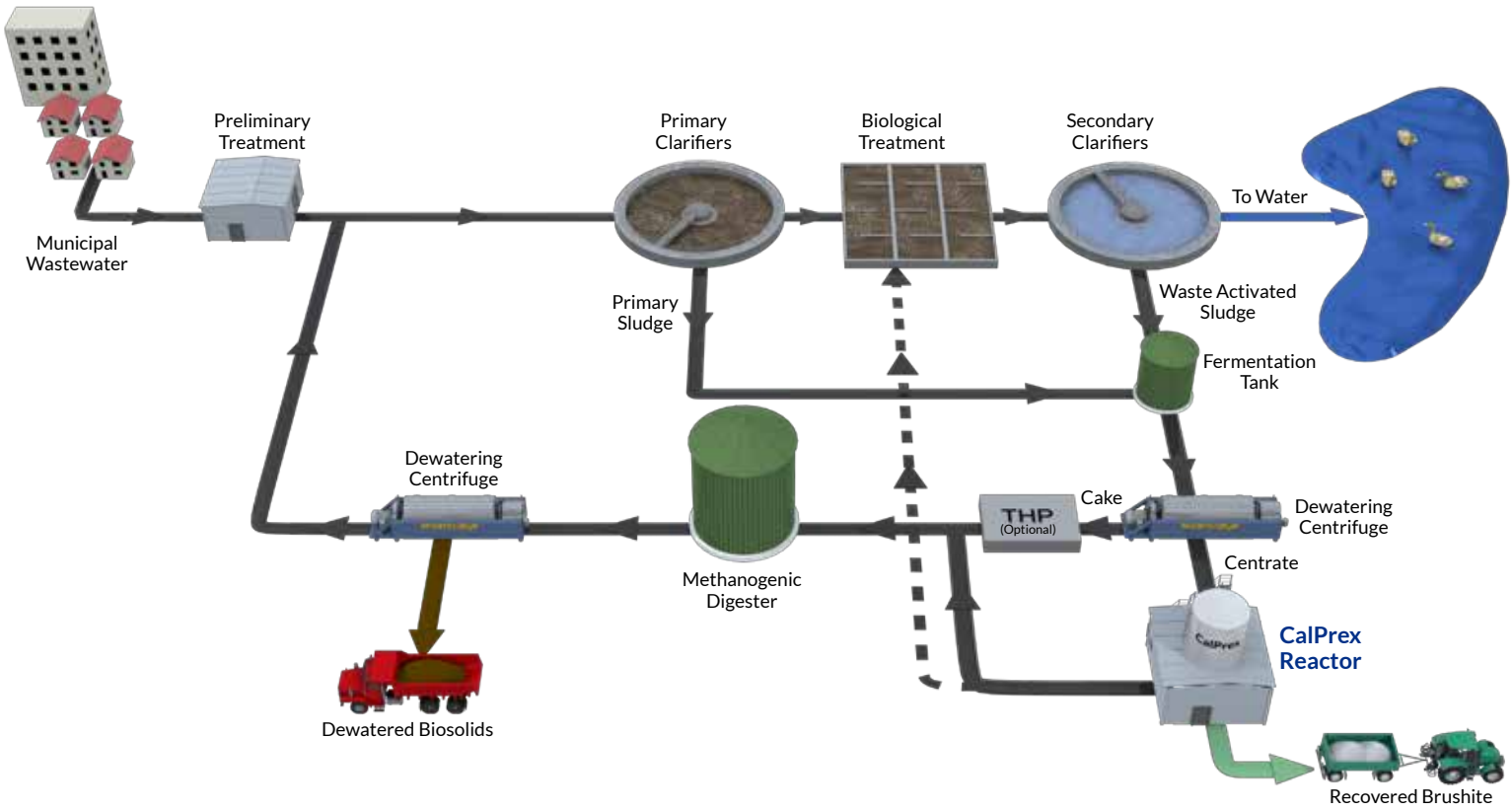
A CalPrex reactor is placed between the fermentation tank and gas phase digesters. Fermented sludge is dewatered. The centrate is sent to the CalPrex reactor. The dissolved phosphorus in the centrate precipitates with the addition of calcium hydroxide. By maintaining the pH of the solution at 6.5, phosphorus is recovered as a brushite crystal ($CaHPO_4 \cdot 2H_2O$). As a fertilizer, brushite is comparable to leading phosphate fertilizers on the market today.

THE BENEFITS

High Efficiency P-Recovery and Digester Protection

- Over **60%** Solubilization of P in Bio-P Sludge
- Divert Over **50%** of the Soluble P from the Digester
- Reduce up to **50%** of the Total P in Biosolids
- Reduce Struvite Buildup in the Methane Digester
- **No** Ammonium Required

PROCESS: CalPrex™



	Centrate Recovery	WAS Fermentation + Centrate Recovery	CalPrex™
Reduce Phosphorus Recycle	✓	✓	✓
Recovery of Marketable Fertilizer	✓	✓	✓
Reduce Struvite Maintenance	✓	✓	✓
Reduce Digester Struvite Buildup	✗	✓	✓
Compact Reactor	✗	✗	✓
Recover P from No/Low Ammonia System	✗	✗	✓
Recover P from Non-Bio-P Plant	✗	✗	✓
Lower Chemical Cost Per P Recovered	✗	✗	✓
Lower Chloride Addition Per P Recovered	✗	✗	✓
High Total P Capture	✗	✗	✓

The CalPrex™ Technology is licensed by Nutrient Recovery and Upcycling LLC.

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