The Seed: An Innovative Idea

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CANDO at bench-scale
CANDO
Coupled Aerobic-anoxic Nitrous Decomposition Operation
Bench-Scale, Synthetic Wastewater

Step 1: $\text{NH}_4^+ \rightarrow \text{NO}_2^-$

Step 2: $\text{NO}_2^- \rightarrow \text{N}_2\text{O}$
Germination: Innovation Partners

Secondary clarifiers, Recycled Water Facility and the Delta End.

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TRANSFORMING WASTEWATER TO RESOURCES
Bench-Scale, Real Wastewater

Step 1
\( \text{NH}_4^+ \) to \( \text{NO}_2^- \)

Step 2
\( \text{NO}_2^- \) to \( \text{N}_2\text{O} \)
Bench-Scale Success

N2O Produced (mg-N)

Hours

N-Remov = 96%
N-Conv = 77%

N-Remov = 94%
N-Conv = 87%

N-Remov = 100%
N-Conv = 79%

N-Remov = 95%
N-Conv = 78%

Nitrite Pulse
Step 1: $\text{NH}_4^+$ to $\text{NO}_2^-$ (continuous flow)

Step 2: $\text{NO}_2^-$ to $\text{N}_2\text{O}$ (Sequencing Batch)
Lessons Learned

Commitment

Resources

Collaboration

Risk Sharing

INNOVATION
Thank You!
Pilot Goals

(1) Achieve at least same N-balance as bench-top

(2) Maximize P-recovery

(3) Use fermented biosolids for carbon

75% Conversion to N₂O
95% N-Removal
NO$_2^-$ to N$_2$O in a single cycle
Increasing $N_2O$ across subsequent cycles
NO$_2^-$ to N$_2$O Conversion = 50%
NO$_2^-$ Removal = 85%

NO$_2^-$ to N$_2$O Conversion = 85%
NO$_2^-$ Removal = 52%