

Nutrient Management with the BioEliminator™ Manure Treatment System

Current BioEliminator™ Performance Data from Pilot Unit at Wagner Dairy in Middleton, WI

(Operational for 6 weeks)

Metric	Units	Influent	Effluent	% Change
pH		6.9	7.5	
TSS	mg/L	22,500	3,600	-84%
TS	%	3.1	1.0	-68%
TVS	%	2.2	0.5	-77%
COD	mg/L	44,940	6,362	-86%
BOD	mg/L	8,980	465	-95%
TKN	mg/L	1,811	1,132	-38%
Ammonia-N	mg/L	896	865	-3.5%
TP	mg/L	329	114	-65%
PO4-P	mg/L	142	94	-34%
Total coliforms	cfu/mL	180,000	270	-99.9%
E.coli	cfu/mL	120,000	250	-99.8%
TKN:P ₂ O ₅ Ratio	-	2.4	4.3	+80%

Agronomist Analysis for Application Rates:

- **Total Nitrogen:** 9.5 lbs/1,000 gal in effluent x 60% available = 5.7 lbs/1,000 gal
 - Assume corn requires 160 lbs N/acre/year: $160/5.7 = 28.07 \times 1,000 = \mathbf{28,070 \text{ gal/acre/yr}}$
 - With lagoon storage, assume 40% of TKN is lost as ammonia: 5.7 lbs/1,000 gal x 60% = 3.4 lbs/1,000 gal
 - Assume corn requires 160 lbs N/acre/year: $160/3.4 = 47.05 \times 1,000 = \mathbf{47,050 \text{ gal/acre/yr}}$
 - Use optional scrubber system to capture ammonia as concentrated ammonium sulfate
- **Total Phosphorus:** 2.2 lbs P₂O₅/1,000 gal in effluent x 50% available = 1.1 lbs/1,000 gal
 - Assume alfalfa requires 54 lbs P/acre/year: $54/1.1 = 49.1 \times 1,000 = \mathbf{49,100 \text{ gal/acre/yr}}$

The effluent of the BioEliminator™ is:

- A more reliable and consistent fertilizer than raw manure or pressate
- Contains more bioavailable nutrients with a higher proportion of inorganic N and P
- Safer to handle and spread (fewer pathogens and lower BOD)
- Makes irrigation a viable alternative to hauling and spreading, taking trucks off the road
- Makes multiple applications of effluent greywater to the growing crop a possibility, helping to improve plant uptake, reduce runoff, provide water to crops when they need it most, reduce groundwater consumption, and boost yields