

Supplementary Information

Inactivation kinetics and mechanisms of viral and bacterial pathogen surrogates during urine nitrification

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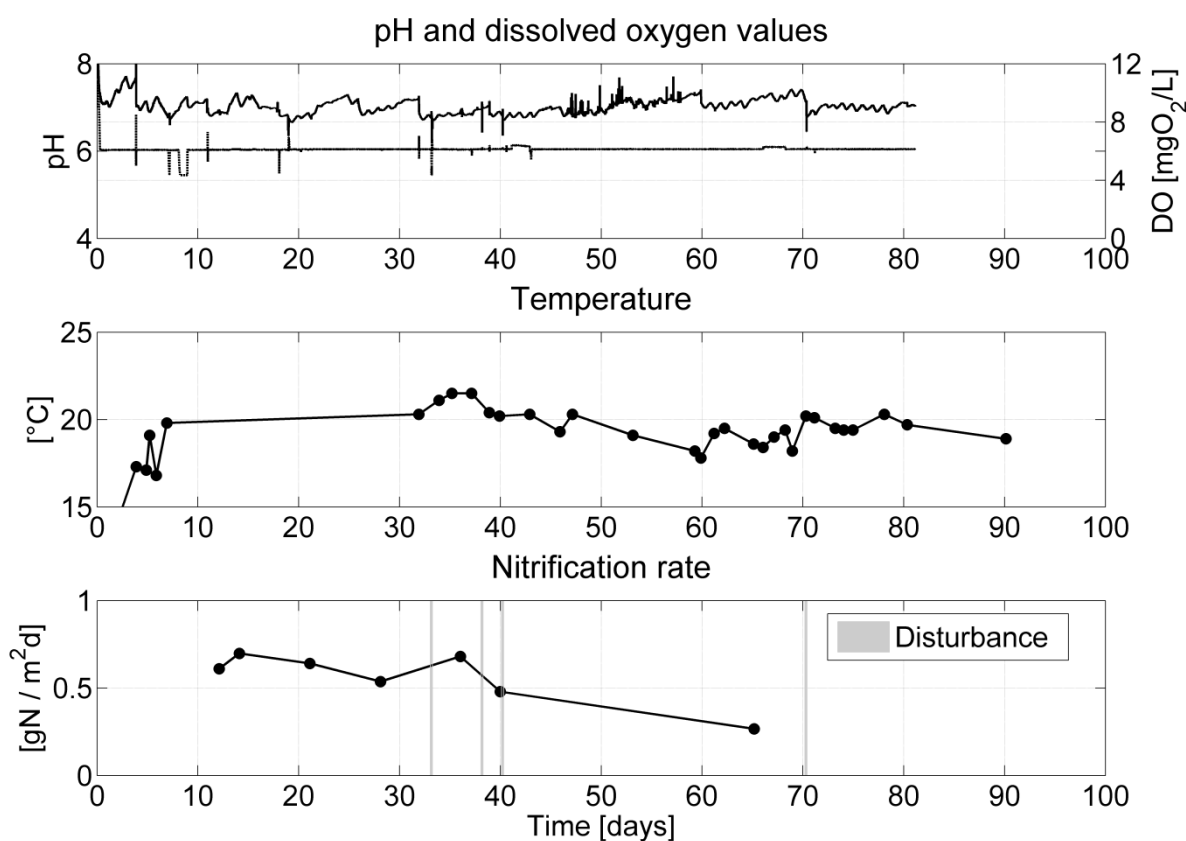


Figure S1. pH (dashed lines), DO (solid lines), temperature and nitrification rates of Reactor 1, a continuous flow urine nitrification moving bed biofilm reactor (MBBR) used to feed batch reactor experiments. The disturbances represented by the grey bars correspond to perturbation events in which reactor content was removed for the batch experiments and replaced with stock material kept at 4°.

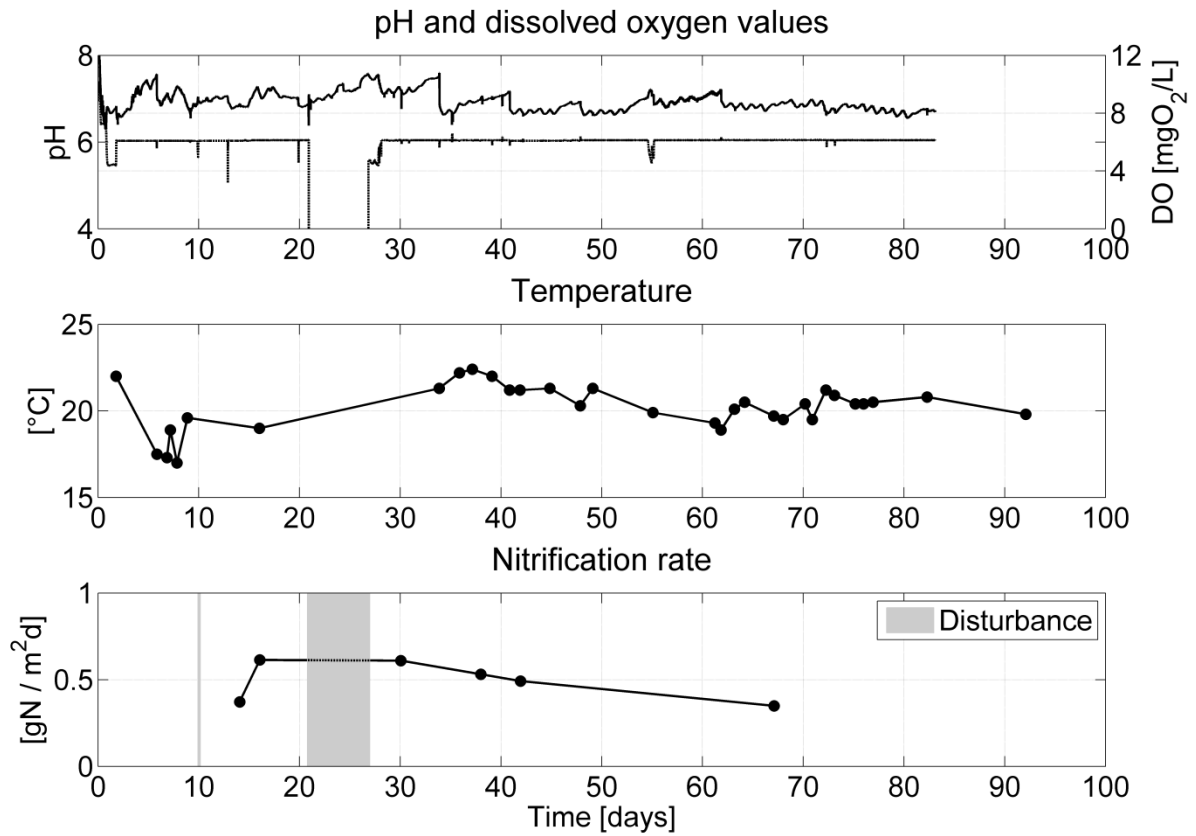


Figure S2. pH (dashed lines), DO (solid lines), temperature and nitrification rates of Reactor 2, a continuous flow urine nitrification moving bed biofilm reactor (MBBR) spiked continuously with MS2 for 51 days. The long disturbance after Day 20 represents a period with no urine input to the reactor, as a parallel experiment required the pH transmitter.

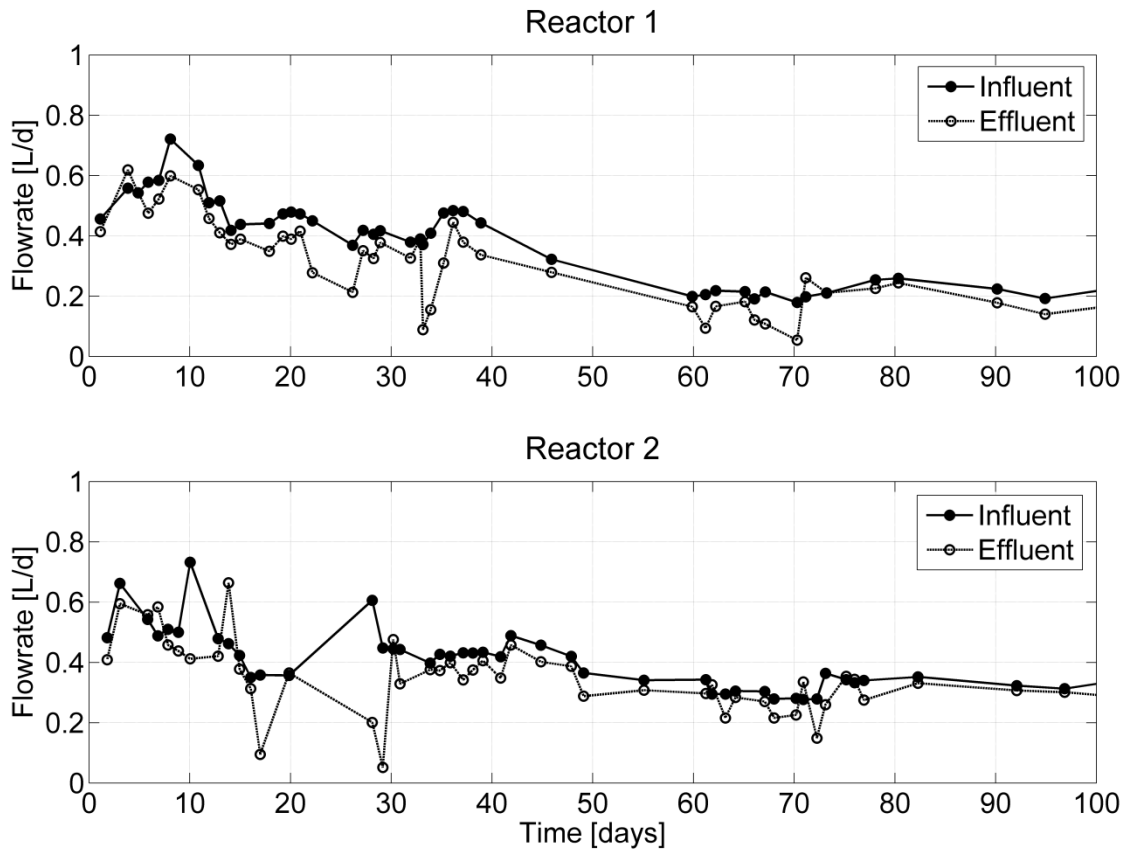


Figure S3. Inflow and outflow rates of continuous flow MBBRs.

Table S1. First-order inactivation rate constants [d⁻¹], determined based on n time points, for additional semi-batch and batch tests conducted and standard error (SE)^a.

	Nitrified urine semi-batch without biofilm carriers, not aerated [d ⁻¹]	Nitrified urine semi-batch without biofilm carriers, not aerated [d ⁻¹]	PBS batch, aerated without biofilm carriers [d ⁻¹]	PBS batch, aerated without biofilm carriers [d ⁻¹]	PBS batch, not aerated, without biofilm carriers [d ⁻¹]
Qβ	0.71 ± 0.10 (n=5; R ² =0.95)	0.80 ± 0.06 (n=5; R ² =0.98)	1.67 ± 0.44 (n=4; R ² =0.88) ^b	1.67 ± 0.41 (n=4; R ² =0.89) ^a	0.27 ± 0.04 (n=5; R ² =0.94)
ΦX174	-	-	0.16 ± 0.04 (n=5; R ² =0.81)	0.19 ± 0.04 (n=5; R ² =0.86)	0.49 ± 0.07 (n=5; R ² =0.94)

^a Standard error of regression for the slope coefficient (k) determined from the log-transformed culturable fraction versus time.

^b Significant at 90% confidence level