Supporting Information

Increasing desalination by mitigating anolyte pH imbalance using catholyte effluent addition in a multi-anode, bench scale microbial desalination cell

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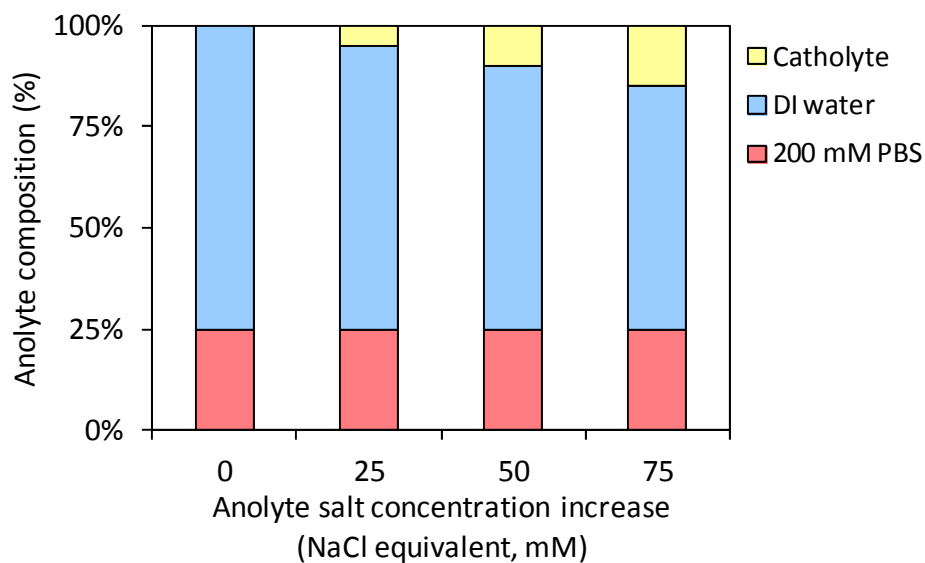*Corresponding author: email- blogan@psu.edu

Figure S1. This shows the method for making the anolyte for "catholyte addition" solutions. The amount of PBS for each experimental condition was constant, while the amount of DI water and catholyte effluent used to dilute the solution to 50 mM PBS was adjusted according to the amount of salt concentration increase desired. The anolyte conductivity for each experimental condition (with catholyte addition) was equal to the anolyte conductivity of the control solution plus a given amount of NaCl addition (25 mM, 50 mM, or 75 mM).
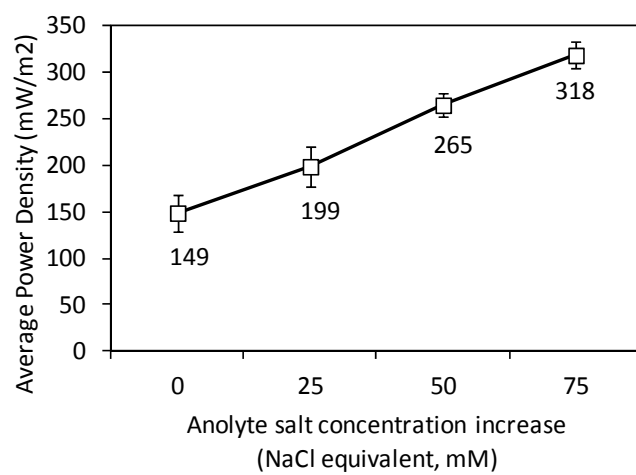
Figure S2. The average power density observed during operation over one desalination cycle at 10 Ω external resistance, using various amounts of catholyte addition.
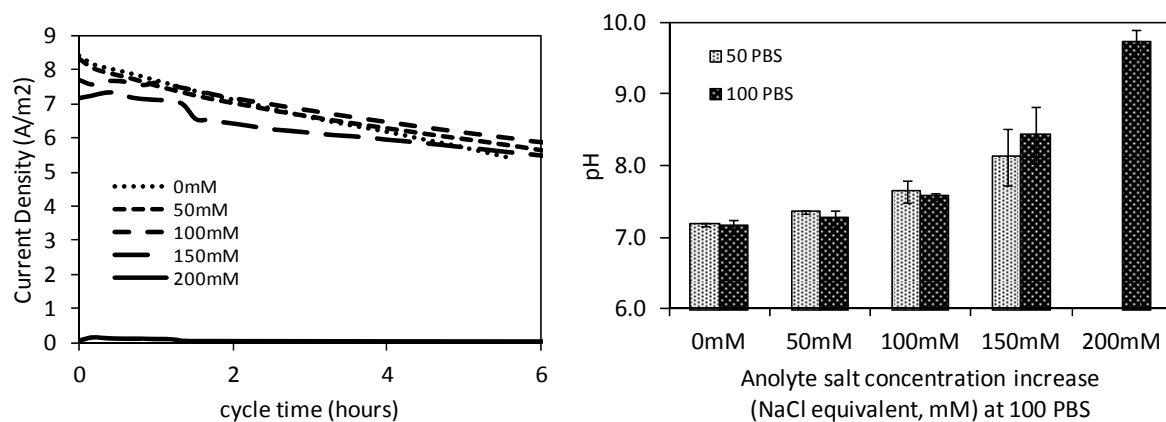
Figure S3. (A) Current density as a function of catholyte addition using 100 mM PBS. Current went to zero with 200 mM catholyte addition and did not recover in subsequent cycles. (B) Initial anolyte pH for the various amounts of catholyte effluent addition.
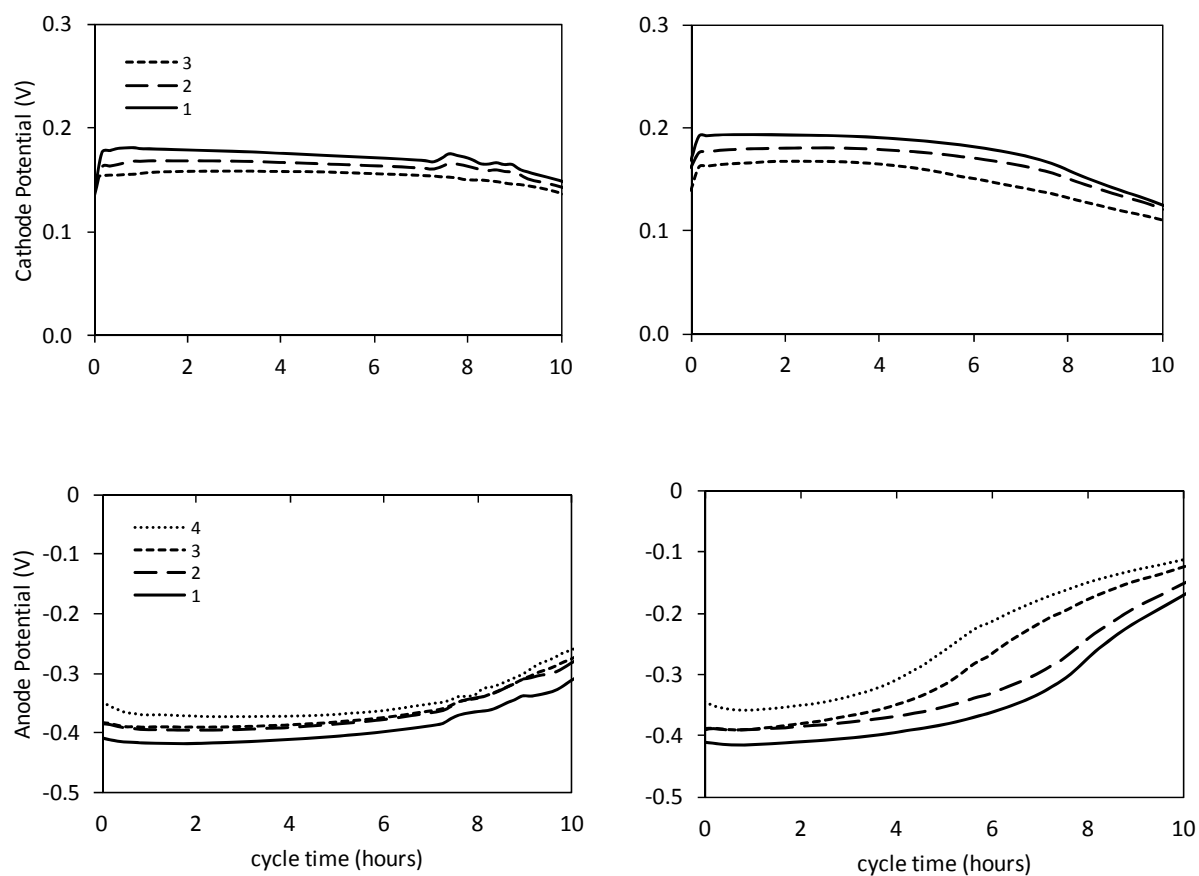
Figure S4. (A) Electrode potentials (vs Ag/AgCl) in 1 mL/min anolyte recirculation mode. The cathode potentials are on the top graph and anode potentials on the bottom. (B) Electrode potentials in anolyte batch-fed mode. The electrodes are ordered by placement in the reactor from bottom (1) to the top electrode (4). Note: the top cathode electrode potentials are not shown because of a malfunction in the reference electrode.
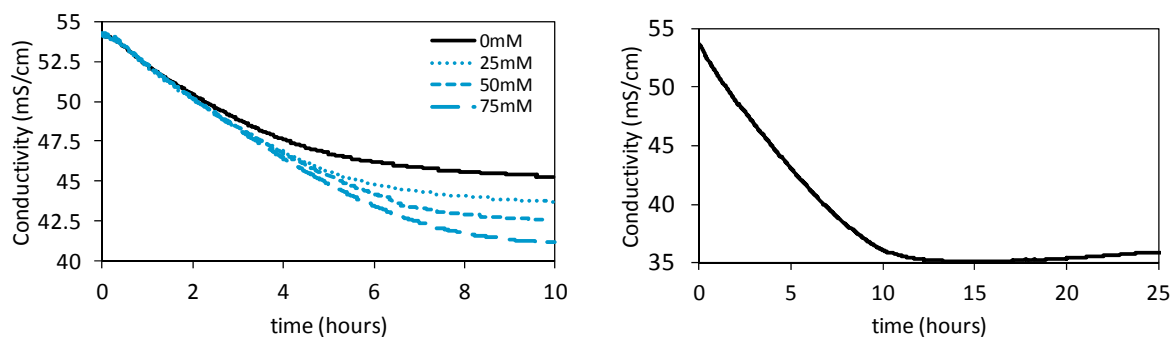
Figure S5. (A) Conductivity of diluate solution as a function of time for various volumes of catholyte effluent addition. The cycle time was set for when the diluate conductivity was at a minimum, which was at about 10 hours for all conditions. (B) The diluate concentration increased when osmotic water loss into the adjacent concentrate chamber was greater than ionic separation from current generation. Current generation decreased along the cycle and reverse desalination is shown at the end of this cycle.