Supplemental Information

Table S1. Summary of different integrated systems for wastewater treatment, nutrient removal, and resource recovery (modified from [18])

Type of System / Characteristics	Type of wastewater / Electrodes	Plant type / External resistance	Average Voltage mV	Max power density mW/m^2	Current density mA/m^2	CE %	COD Removal %	Nitrate Removal %	Phosphate Removal %	Plant biomass grow	Phosphate Recovery %	Reference
Two Upflow hydroponic CW-MFC (With ceramic separator, Without ceramic separator) Continuous mode	Synthetic wastewater Anode & cathode: carbon felts	*Canna indica* 1000 Ω	With ceramic separator: ~900 mV Without ceramic separator: ~800 mV	With ceramic separator: 258.78 $mW.m^{-3}$ Without ceramic separator: 91.02 $mW.m^{-3}$	With ceramic separator: ~560 $mA.m^{-3}$ Without ceramic separator: ~190 $mA.m^{-3}$	NA	With ceramic separator: 86.2±8.1 % Without ceramic separator: 91.5±4.9 %	NA	NA	NA	NA	[28]
Integrated drip hydroponics-MFC Batch recirculation mode.	Domestic sewage collected from the sedimentation tank of the primary treatment unit Anode& cathode: non-catalyzed disc-shaped graphite.	*Cymbopogon citratus* 20 kΩ	In series: 1490±91 mV In parallel: 1580±5 mV	31.9 $mW.m^{-2}$ in series and parallel	In series: ~36 $mA.m^{-2}$ In parallel: ~458 $mA.m^{-2}$	NA	72±2.4% at HRT = 3 hours 85.7±0.6 % at HRT = 12 hours	NA	83.2±1.1 % at HRT = 3 hours 85.8±0.6 % at HRT = 12 hours	Per plant: 45±15 cm 0.216±0.039 g	NA	[30]

Table S1. (continued)

Type of System / Characteristics	Type of wastewater / Electrodes	Plant type / External resistance	Average Voltage mV	Max power density mW/m^2	Current density mA/m^2	CE %	COD Removal %	Nitrate Removal %	Phosphate Removal %	Plant biomass grow	Phosphate Recovery %	Reference
Floating treatment wetlands-MFC	Urban wastewater	*Canna generalis*	Maximum Voltages in:									
Closed system for 3 weeks		*Chrysopogon zizanioides*	Open circuit:									
	Cathode: graphite rods	*Cyperus papyrus Nanus*	225 mV (*C generalis*)									
	Anode: PVC hose filled with graphite sticks.	*Hymenachne grumosa*	212 mV (*H. grumosa*)	$0.93mWm^{-2}$ (When max voltage is 108 mV from all plants in parallel)	NA	NA	71.40%	TN: 8.4%	TP: 11.4%	NA	NA	[54]
		Equisetum hyemale	144 mV (*C. zizanioides*)									
			137.4 (*C. papyrus Nanus*)									
		1000 Ω	89.6 mV (*E. hyemale*)									
			Closed circuit:									
			21.0 mV (*C generalis*)									

Table S1. (continued)

Type of System / Characteristics	Type of wastewater / Electrodes	Plant type / External resistance	Average Voltage mV	Max power density mW/m^2	Current density mA/m^2	CE %	COD Removal %	Nitrate Removal %	Phosphate Removal %	Plant biomass grow	Phosphate Recovery %	Reference
Ecological floating bed-MFC	Synthetic eutrophication influent	*Cyperus alternifolius Linn.subsp. flabelliformis (Rottb.) Kukenth* (EFB-MFC1)	Control: 99mV				Control: 73.88%	TN:				
After 30 days start-up period, operated continuously for 116 days.	Anode & Cathode: stainless-steel mesh and carbon felt.	*Ceratophyllum demersum Linn* (EFB-MFC2)	EFB-MFC1: 125 mV	The maximum power density was EFB-MFC4: 6.03mWm^{-2}	NA	NA	EFB-MFC1: 73%	Control: 38.74% EFB-MFC1: 34.76%	NA	NA	NA	[27]
		Eichhornia crassipes (Mart.) Solms Pontereia crassipes Mart (EFB-MFC3)	EFB-MFC2: 144 mV				EFB-MFC2: 76.37%	EFB-MFC2: 41.65%				
		Ipomoea aquatic Forsk (EFB-MFC4)	EFB-MFC3: 157 mV				EFB-MFC3: 78.23%	EFB-MFC3: 51.21%				
		500 Ω	EFB-MFC4: 161 mV				EFB-MFC4: 82.49%	EFB-MFC4: 55.6%				

Table S1. (continued)

Type of System / Characteristics	Type of wastewater / Electrodes	Plant type / External resistance	Average Voltage mV	Max power density mW/m^2	Current density mA/m^2	CE %	COD Removal %	Nitrate Removal %	Phosphate Removal %	Plant biomass grow	Phosphate Recovery %	Reference
MFC-Hyp-Plants Batch mode.	Synthetic potato wastewater Anode: bamboo charcoal plates. Cathode: platinum-coated carbon cloth	*Allium tuberosum* 973Ω	Max 403mV	250.7	Max 2367.9	4.8	80.4±1.39	31.7±0.17	11.4±0.02	P1: 6.5cm P2: 7.5cm PC: 2.2 cm	7.3	[18]
MFC-Hyp-Control Batch mode.	Synthetic potato-process wastewater Anode: bamboo charcoal plates. Cathode: platinum-coated carbon cloth.	*Allium tuberosum* 973Ω	Max 396mV	210.7	Max 1821.6	5.5	78.7±1.66	28.9±0.10	8.9±0.08	NA	4.7	[18]
MFC-Hyp Batch mode.	Synthetic potato-process wastewater Anode: bamboo charcoal plates. Cathode: platinum-coated carbon cloth.	*Allium tuberosum* 973Ω	Max 344 mV	130.2±45.4 mW/m^2	558.0±217.5 mA/m^2	--	96.30%	-100% (Increased)	-7.9% (Increased)	142% (Dry weight)	--	This study

--, Not determined

NA, Not available

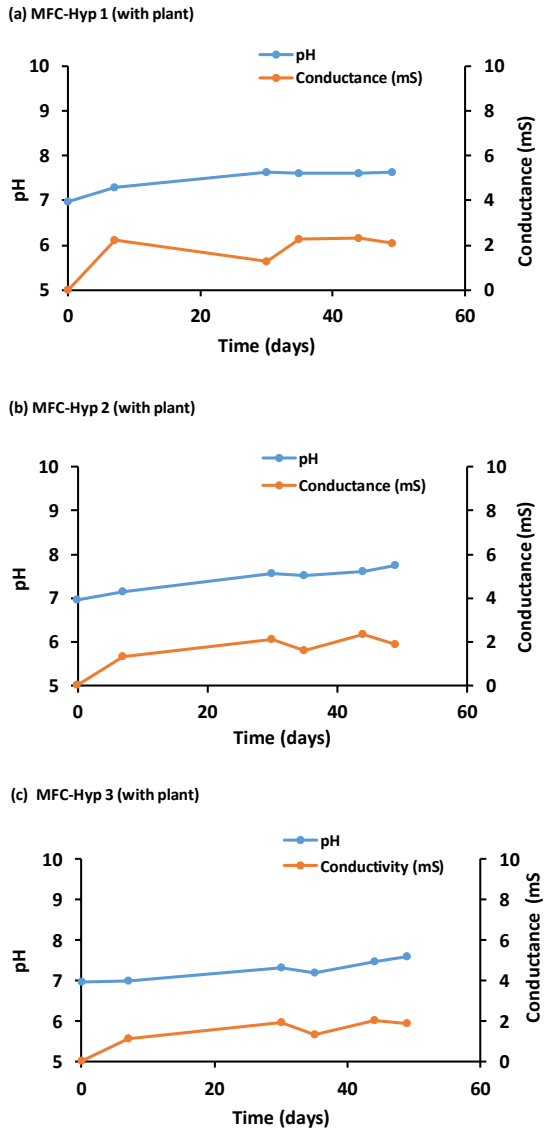

Figure S1: pH and conductance of water in the hydroponics in the presence of *A. tubersosum: (a) MFC-Hyp 1; (b) MFC-Hyp 2; (3) MFC-Hyp 3*

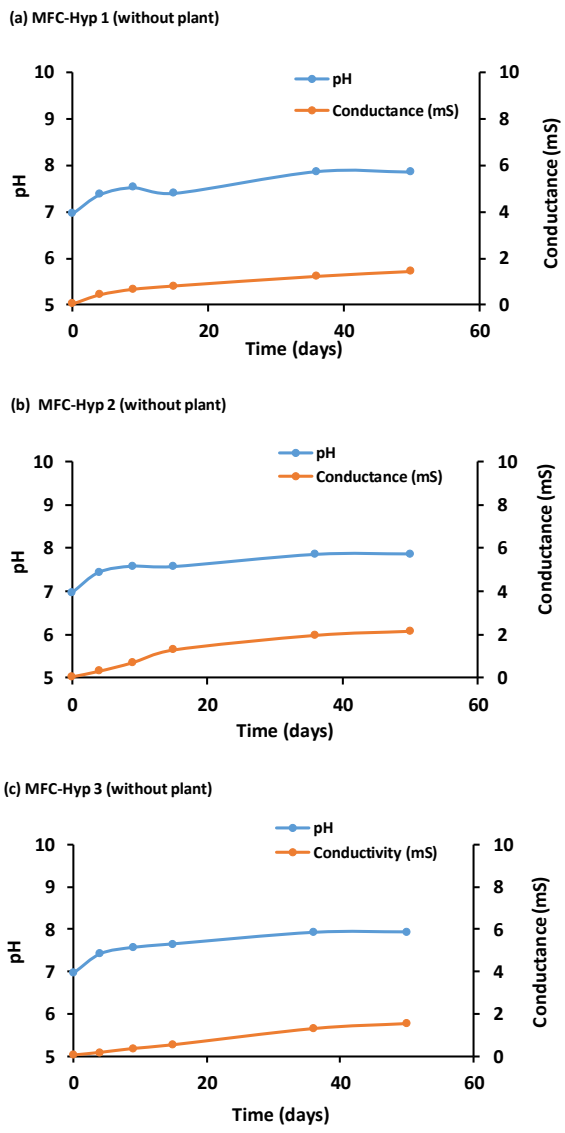

Figure S2: pH and conductance of water in the hydroponics in the absence of *A. tubersosum* : (a) MFC-Hyp 1; (b) MFC-Hyp 2; (c) MFC-Hyp 3

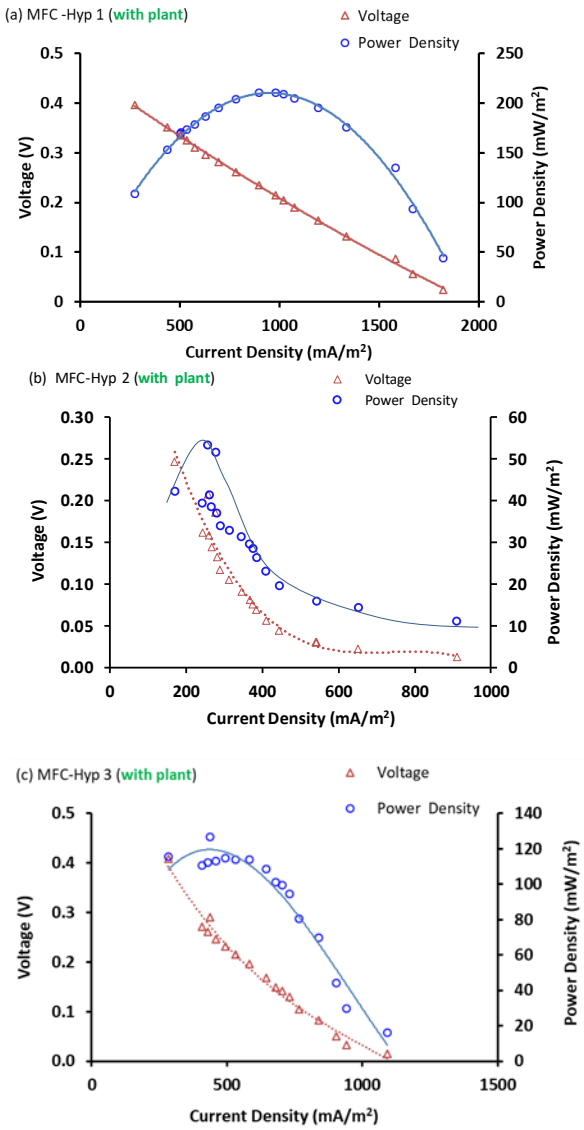

Figure S3. Polarization and power density curves for MFC-Hyp 1, 2, and 3 in the presence of *A. tuberosum.*

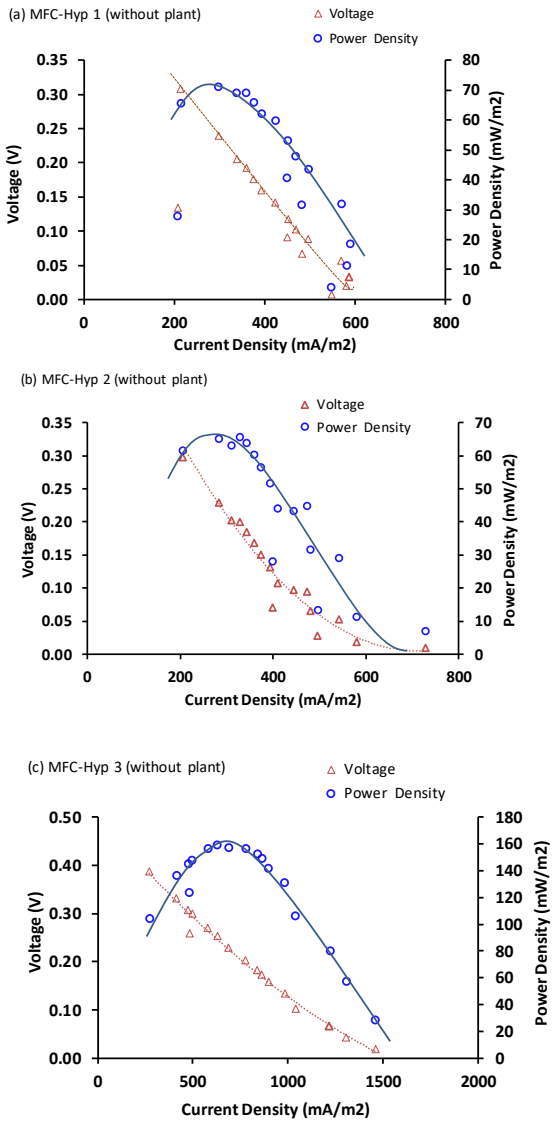

Figure S4. Polarization and power density curves for MFC-Hyp 1, 2, and 3 in the absence of *A. tuberosum.*