

The Ultimate Fate of Reactive Dyes Absorbed onto Polymer Beads: Feasibility and Optimization of Sorbent Bio-Regeneration Under Alternated Anaerobic–Aerobic Phases

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Determination of RR concentration in polymeric phase

During all the abiotic tests, included dye loading experiments, the concentration of RR in the liquid phase was analysed vs. time by using a UV/VIS Spectrometer (PerkinElmer, Lambda 25) with readings at 509 nm, then the following mass balance equation was applied to estimate RR polymeric concentration

$$C_{\text{pol},t} = \frac{(C_{\text{w},t0} - C_{\text{w},t}) * V_{\text{w}}}{m_{\text{pol}}}$$

where $C_{\text{pol},t}$ is the polymer concentration of RR at time t, while $C_{\text{w},t0}$ and $C_{\text{w},t}$ are the aqueous concentrations of RR at time t=0 and time t. V_{w} is the liquid volume of the sorption test and m_{pol} is the mass of polymer.

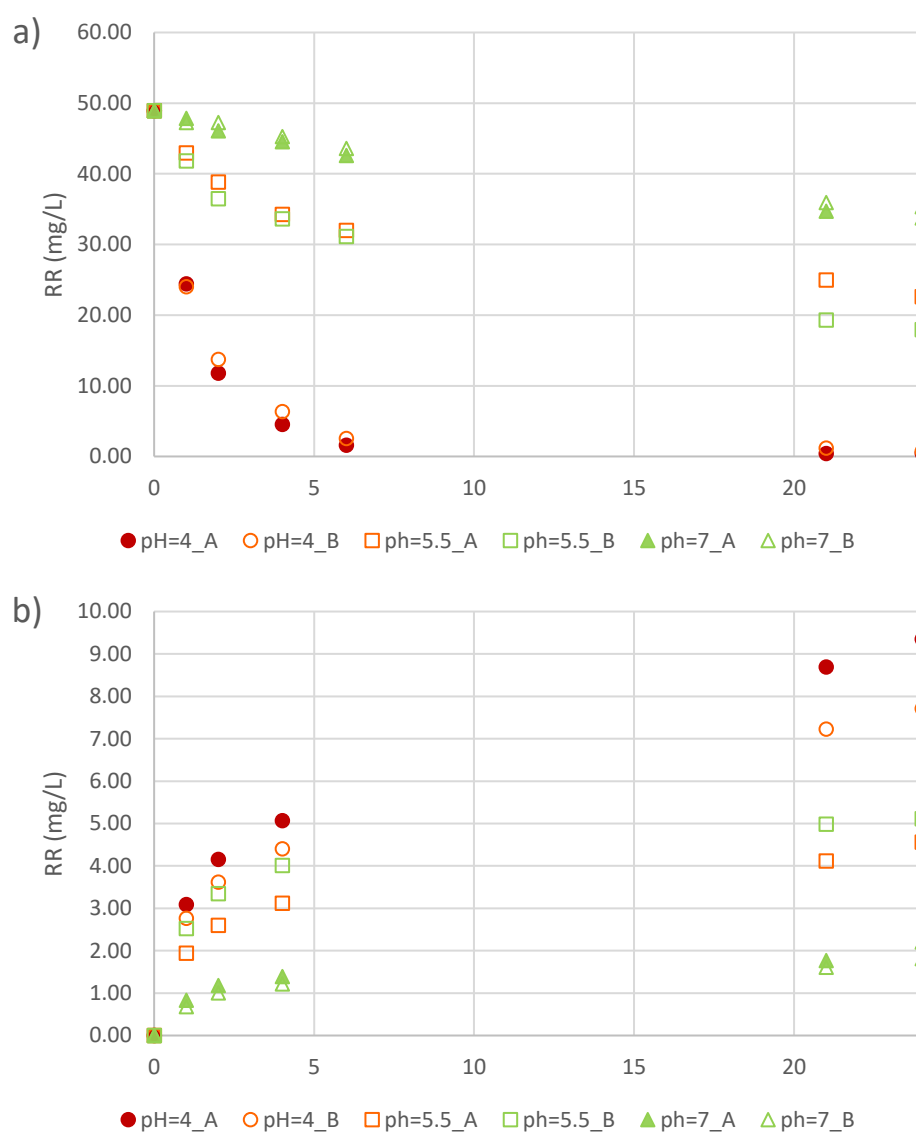


Figure S1. Data of RR concentration in liquid phase detected during kinetic sorption (a) and desorption (b) tests.

Table S1 Polymer loading tests (PWR: polymer-to-water ratio; MTR: mass transfer rate)

Test	pH	RR	Duration	Final C _{pol}	MTR	
		(mg/L)	(h)	(mg/g _{pol})	(mg/L h)	(mg/g _{pol} h)
T1	5.5	100.9	7	0.61	0.2188	0.0021
T2	5.5	99.6	6	0.67	2.5279	0.0235
T3	4	74.6	6.5	2.34	7.6154	0.6499
T4	4	95.9	5.5	4.04	16.2876	1.4005

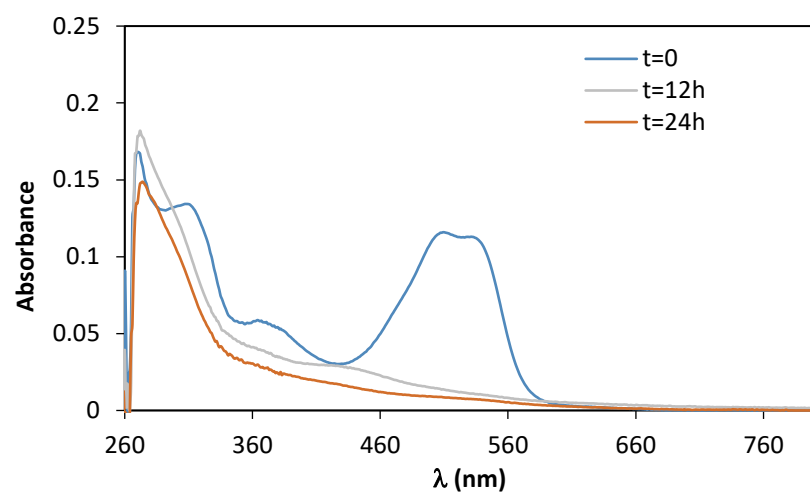


Figure S2. UV-visible spectra during the kinetic test for biomass characterization.

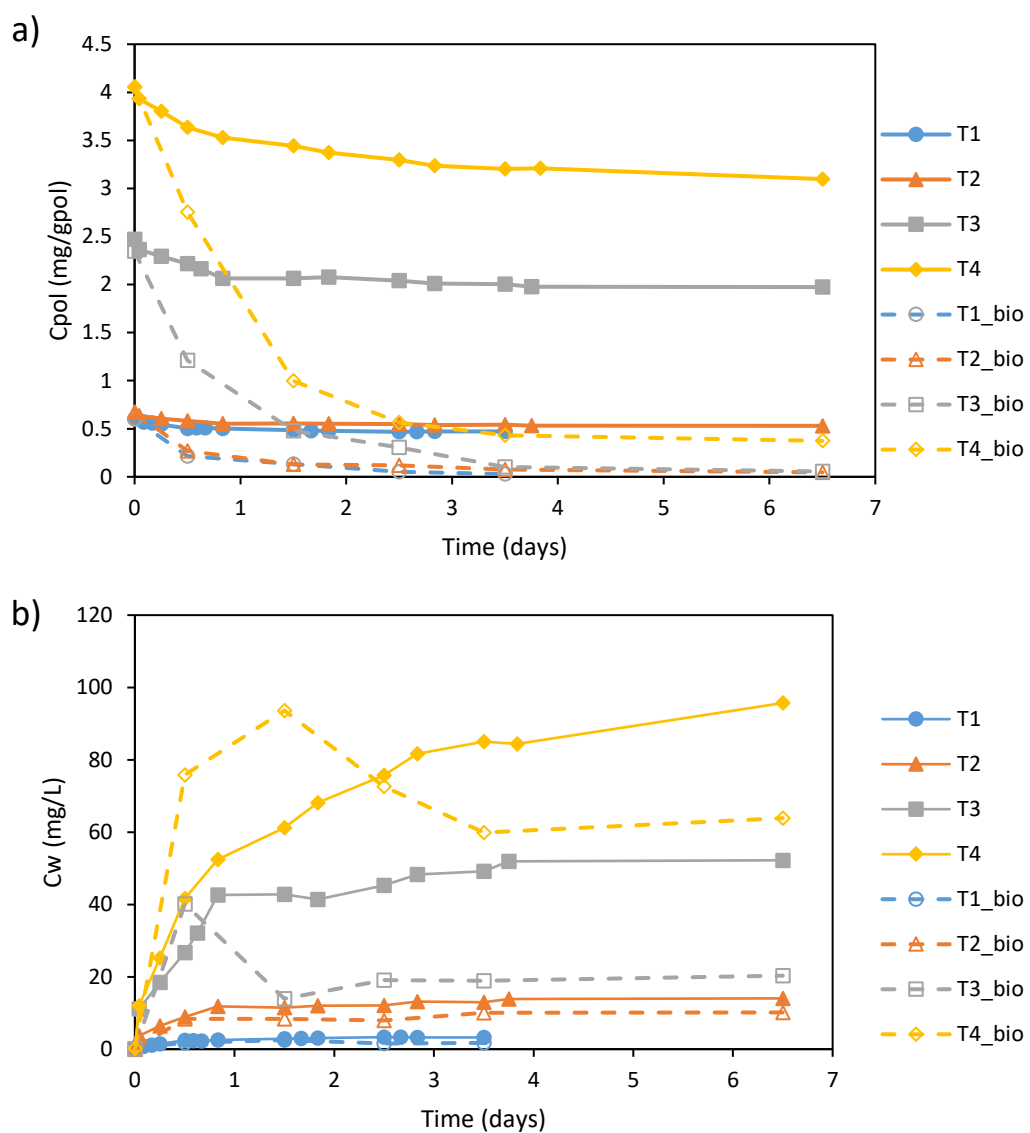


Figure S3. RR polymeric (a) and liquid (b) concentrations detected during abiotic and biotic T1, T2, T3 and T4 tests.

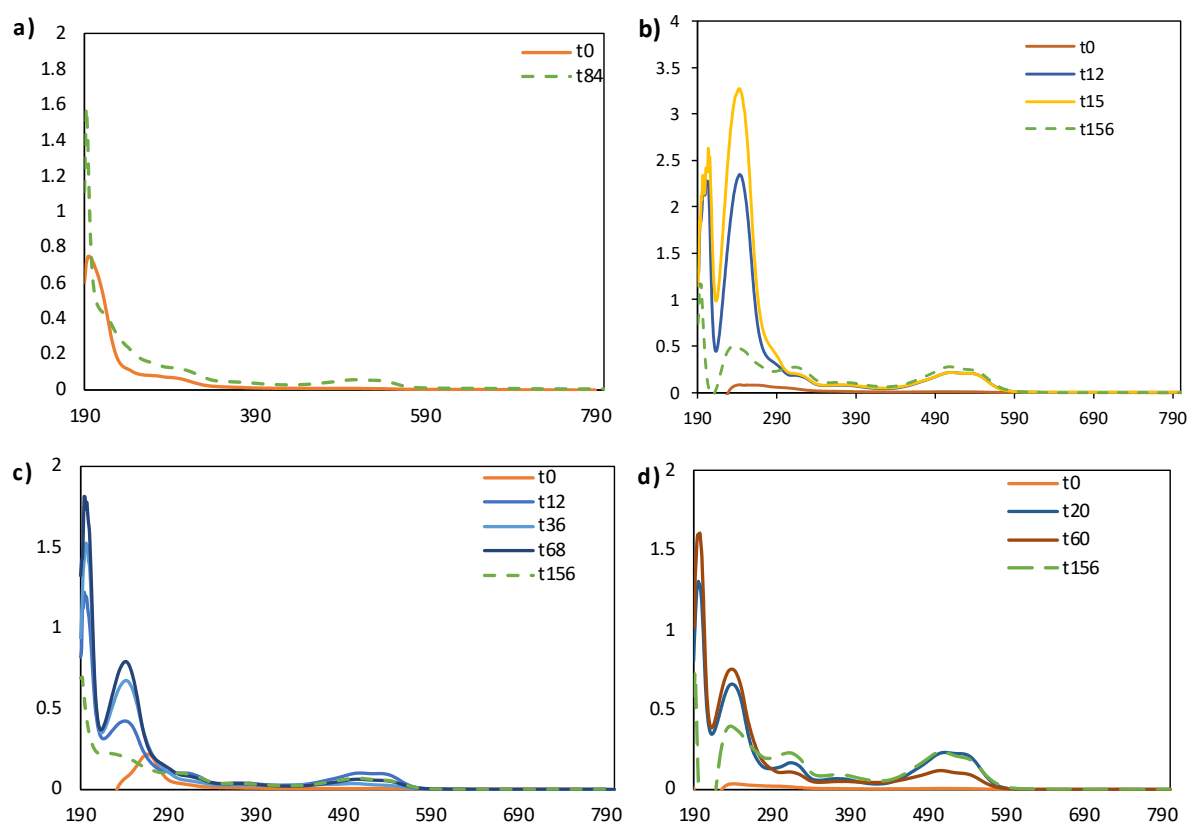


Figure S4. UV-visible spectra detected at different time intervals during T1 (a), T2 (b), T3 (c) and T4 (d) bio-regeneration tests.

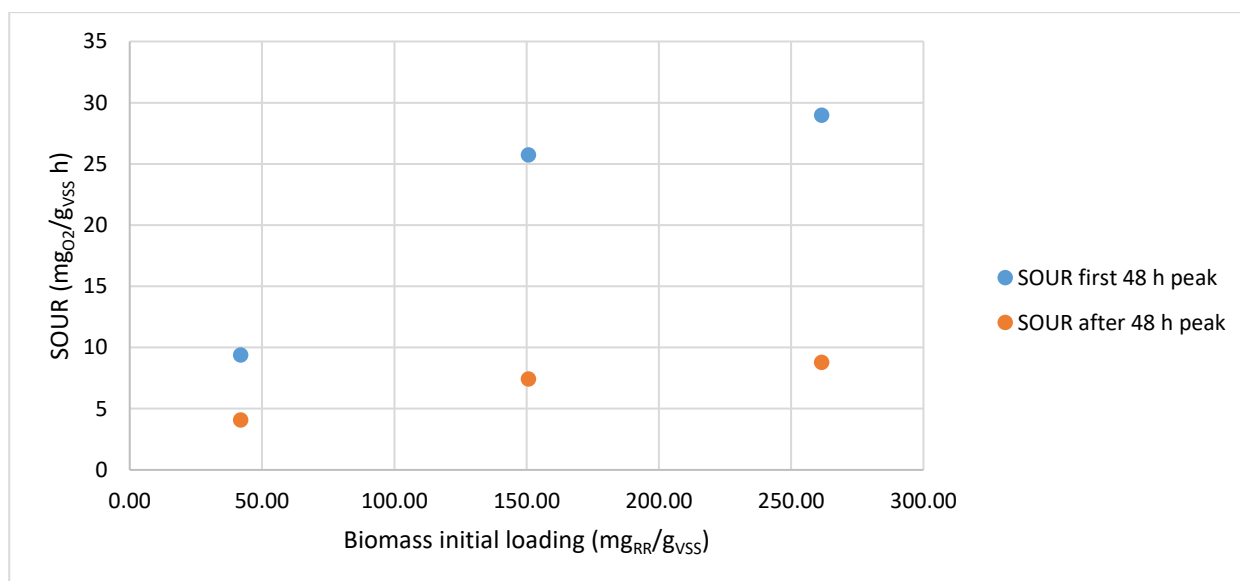


Figure S5. SOUR data vs. dye loading applied during bio-regeneration test.