Electronic Supplementary Information

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Title: Photo-induced environmental depletion processes of β-blockers in river waters

Number of pages: 5 (including cover sheet)

Number of Figures: 2

Number of Tables: 3

Fig. 1 Sampling locations of river waters in UK

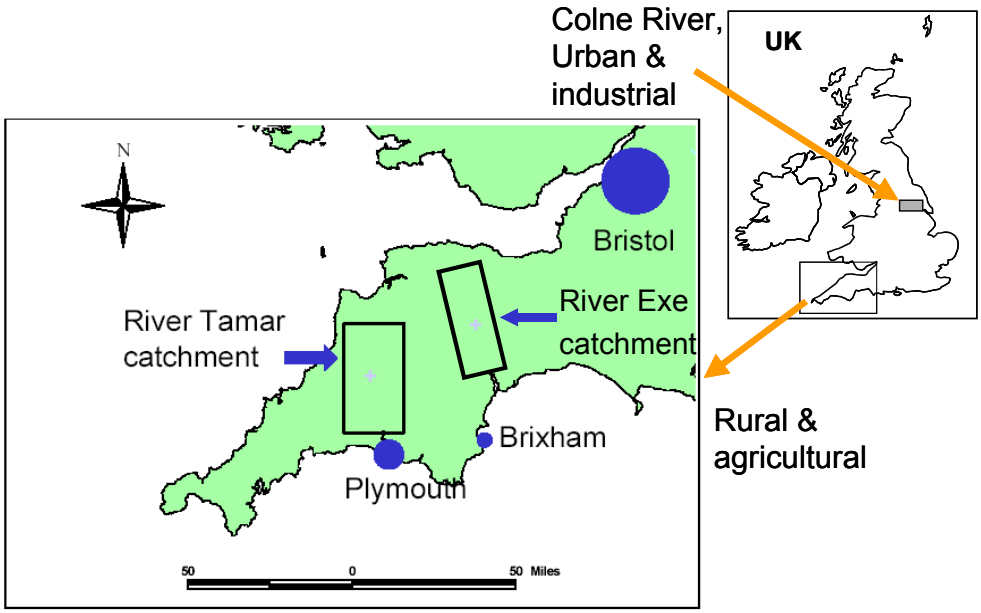

Fig. 2 Reaction vessels for the photo-induced studies

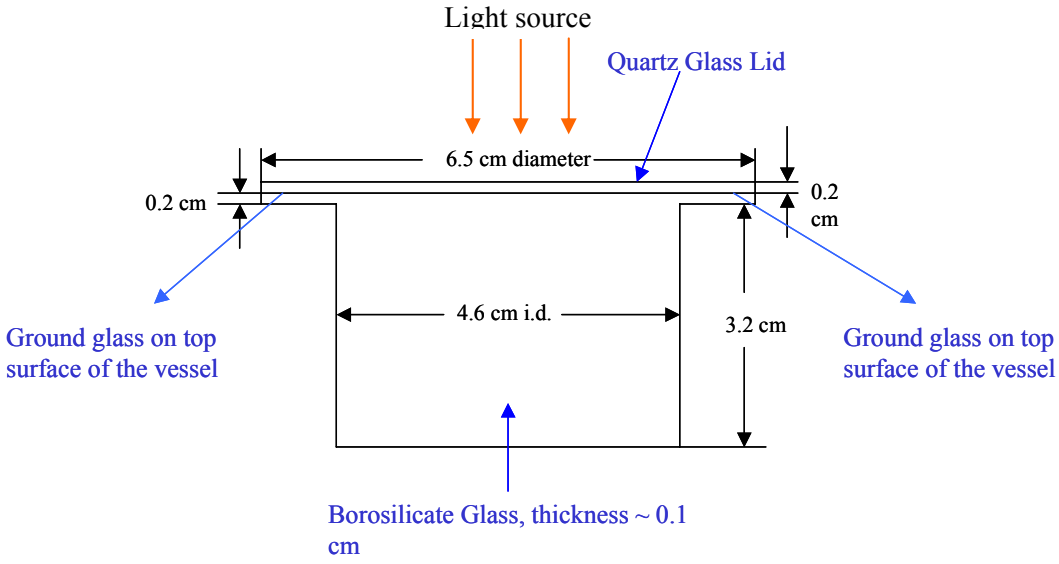

Table 1 Chemical analysis of fresh and frozen samples that were stored at -20 °C for 16 days (mg L^{-1})

River Water Sample (0142)

m/z	24 h	24 h Frozen	48 h	48 h Frozen
276	0.022	0.013	0.015	0.012
292-1	0.600	0.606	0.356	0.257
292-2	0.139	0.156	0.158	0.154
308	0.251	0.260	0.228	0.222
310	0.075	0.131	0.166	0.131
264	0.200	0.170	0.211	0.172
258	0.018	0.019	0.038	0.030
Propranolol	0.246	0.310	0.036	0.032

Dark control River Water (Propranolol)

	Original Value	Frozen Sample
0hr	10.45	10.02
24hr	10.21	10.38
48hr	10.64	10.25

Table 2. River water parameters and measured 1st order degradation rate constants for propranolol, metoprolol and atenolol [$]

	Exe May 05 US	**Exe May 05 DS**	**Tamar May 05 US**	**Tamar May 05 DS**	**Tamar Jul. 05 DS**	**Colne Aug. 05**	**Colne Nov. 05**	**Colne Aug. 06**	**Tamar Aug. 06 DS**
Sampling T (^{o}C)	12.58	12.67	12.49	12.11	18.22	14.14	6.2	15.46	
pH (field)	7.45	7.67	6.9	6.8	7.27	7.08	7.63	7.66	7.38
pH (lab)	6.77	6.82	6.79	6.79	6.89			7.96	8.01
Dissolved OC (as C) (mg L-1)	1.60	1.39	3.42	3.17	4.14	3.87		5.25	4.81
Nitrate as N (mg L-1)	2.692	2.272	2.497	2.378	1.175	2.548		2.993	1.024
Ammoniacal N_2 as N (mg L^{-1})	<0.030	0.061	0.036	0.050	0.054	0.067		0.048	0.142
Nitrite as N (mg L^{-1})	0.028	0.018	0.013	0.012	0.005	0.052		0.017	0.066
N_2 total oxidised as N (mg L^{-1})	2.720	2.290	2.510	2.390	1.180	2.600		3.010	1.090
Orthophosphate as P (mg L^{-1})	0.058	0.056	0.033	0.068	0.105	0.133		0.101	0.061
Redox potential (mV)	236.0	245.8	245.3	237.0	292.1	116.9		336.3	
Dissolved oxygen %	105.1	104.1	105.1	98.6	104.6	90.5	91.2	100	
Conductivity (us)	174	143	171	174	215	277	392	311	249
Suspended solids at 105 ^{o}C (mg L^{-1})					3.00	5.00		4.00	7.00
Solids, < 63 um (%)								80.79	94.37
Sorting coefficient								1.29	1.10
$k_{propranolol}$ (h^{-1})[$]	0.077	0.089	0.12	0.13					
$k_{metoprolol}$ (h^{-1})[$]					0.0078	0.0089	0.0082	0.021	0.015
$k_{atenolol}$ (h^{-1})[$]		0.021		0.020	0.011	0.013		0.013	0.0058

[$] All kinetics summarised in this Table was measured in non-sterilised river waters with replicates.

Table 3 Percentage of particles measured in three river water samples and statistical analysis of differences among samples

Particle size (microns)	% total suspended solids		
	Colne	Tamar Upper Stream	Tamar Down Stream
50.2-39	9.91	6.66	6.59
< 5.8	4.5	7.35	6.93
> 2000	0.00	0.00	0.00
11.4-9.1	5.17	7.60	7.60
112-84	5.67	2.07	1.30
14.5-11.4	7.24	10.83	11.05
160-112	3.93	0.62	1.04
18.5-14.5	8.88	13.10	13.48
2000-500	0.00	0.00	0.00
23.7-18.5	10.10	13.86	14.31
261-160	1.46	0.00	0.84
30.3-23.7	10.47	12.32	12.73
39-30.3	10.61	9.77	10.03
564-261	0.01	0.00	0.02
64-50	8.68	4.31	3.81
7.2-5.8	2.27	3.14	2.92
84-64	7.36	3.02	2.15
9.1-7.2	3.77	5.37	5.2
Inclusive Graphic Skewness (SKI)	-0.030	-0.050	-0.050
Particle Diameter, Mean (phi)	4.630	5.310	5.260
Particle Diameter, Median (phi)	5.130	5.690	5.690

Output from minitab;
series of paired t-tests undertaken on arcsine square-root transformed data

Results indicate that there is no significant difference between any of the samples with respect to the ditribution of sediment sizes

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Welcome to Minitab, press F1 for help.

Paired T-Test and CI: Colne_trans, Tamar US_trans

Paired T for Colen_trans - Tamar US_trans

                N    Mean   StDev  SE Mean
Colen_trans     20  0.2130  0.1076  0.0241
Tamar US_trans  20  0.2035  0.1293  0.0289
Difference      20  0.0095  0.0649  0.0145


95% CI for mean difference: (-0.0209, 0.0399)
T-Test of mean difference = 0 (vs not = 0): T-Value = 0.65  P-Value = 0.523


Paired T-Test and CI: Colne_trans, Tamar_DS_trans

Paired T for Colen_trans - Tamar_DS_trans

                N    Mean   StDev  SE Mean
Colen_trans     20  0.2130  0.1076  0.0241
Tamar_DS_trans  20  0.2068  0.1238  0.0277
Difference      20  0.0062  0.0643  0.0144


95% CI for mean difference: (-0.0238, 0.0363)
T-Test of mean difference = 0 (vs not = 0): T-Value = 0.43  P-Value = 0.669


Paired T-Test and CI: Tamar US_trans, Tamar_DS_trans

Paired T for Tamar US_trans - Tamar_DS_trans

                N     Mean    StDev  SE Mean
Tamar US_trans  20   0.2035   0.1293  0.0289
Tamar_DS_trans  20   0.2068   0.1238  0.0277
Difference      20  -0.00321  0.02412  0.00539


95% CI for mean difference: (-0.01450, 0.00808)
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