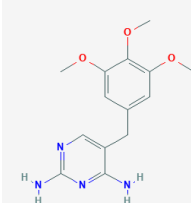
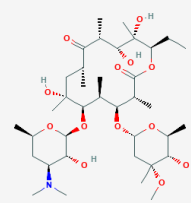
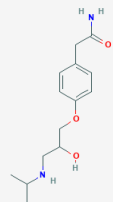
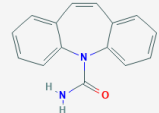
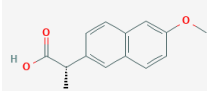


Removal of Pharmaceuticals in a Macrophyte Pond-Constructed Wetland System and the Effect of a Low Effluent Recirculation

Rayco Guedes-Alonso, José A. Herrera-Melián, Francisca Sánchez-Suárez, Verónica Díaz-Mendoza, Zoraida Sosa-Ferrera and José J. Santana-Rodríguez

Supplementary material

Table S1. Therapeutic classification and molecular structure of target pharmaceuticals.

Therapeutic class	Compound	Molecular structure
Antibiotics	Trimethoprim (TRIM)	
	Erythromycin (ERY)	
Antihypertensive	Atenolol (ATE)	
Antiepileptic	Carbamazepine (CBZ)	
Non-steroidal anti-inflammatories	Naproxen (NPX)	

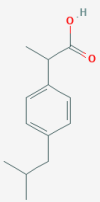
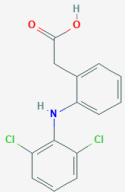
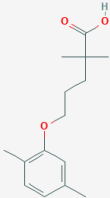
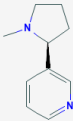
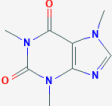
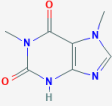
Ibuprofen (IBU)		
Diclofenac (DIC)		
Lipid regulator	Gemfibrozil (GEM)	
Nicotine (NICO)		
Stimulant	Caffeine (CAFF)	
	Paraxanthine (PRX)	

Table S2. Average concentrations ($\mu\text{g L}^{-1}$) \pm std. dev. and (number of positive readings) in 2018 (no recirculation) and 2019 (50 % recirculation).

	Recirculation	Influent	Pond effl.	CW effluent
NICO	0%	3.2 ± 2.0 (6)	0.75 ± 0.42 (6)	0.17 ± 0.08 (6)
	50 %	2.3 ± 1.3 (5)	0.30 ± 0.18 (6)	0.11 ± 0.10 (6)
ATE	0%	0.008 ± 0.015 (3)	0.001 ± 0.001 (4)	0.000 ± 0.001 (2)
	50 %	0.007 ± 0.010 (2)	0.009 ± 0.007 (5)	0.006 ± 0.007 (4)
TRIM	0%	0.00 (0)	0.01 (1)	0.00 (0)
	50 %	0.07 ± 0.16 (2)	0.003 ± 0.005 (2)	0.000 (0)
PRX	0%	14.3 ± 8.1 (6)	0.6 ± 0.8 (6)	0.5 ± 0.5 (6)
	50 %	32.0 ± 23.7 (5)	1.0 ± 1.5 (5)	0.02 ± 0.04 (2)
CAFF	0%	124 ± 101 (6)	6.7 ± 4.1 (6)	2.8 ± 1.5 (6)
	50 %	123 ± 53 (5)	2.8 ± 2.3 (6)	0.03 ± 0.00 (1)
ERY	0%	0.000 (0)	0.000 (0)	0.000 (0)
	50 %	0.000 (0)	0.000 (0)	0.000 (0)
CBZ	0%	0.002 (1)	< LOQ (0)	< LOQ (0)
	50 %	0.000 (0)	0.000 (0)	0.000 (0)
NPX	0%	3.4 ± 2.3 (6)	1.2 ± 0.2 (6)	0.9 ± 0.4 (6)
	50 %	4.0 ± 2.1 (5)	1.1 ± 0.9 (6)	0.4 ± 0.3 (6)
IBU	0%	14.0 ± 8.8 (6)	6.8 ± 2.5 (6)	3.3 ± 1.6 (6)
	50 %	4.4 ± 1.9 (5)	4.0 ± 1.8 (6)	2.5 ± 2.0 (6)
DCLF	0%	0.00 ± 0.00 (0)	0.015 ± 0.01 (5)	0.019 ± 0.008 (6)
	50 %	0.05 ± 0.02 (5)	0.08 ± 0.03 (6)	0.08 ± 0.03 (6)
GMF	0%	0.00 ± 0.00 (0)	0.04 ± 0.07 (2)	0.19 ± 0.05 (6)
	50 %	0.03 ± 0.03 (5)	0.08 ± 0.05 (6)	0.05 ± 0.01 (6)

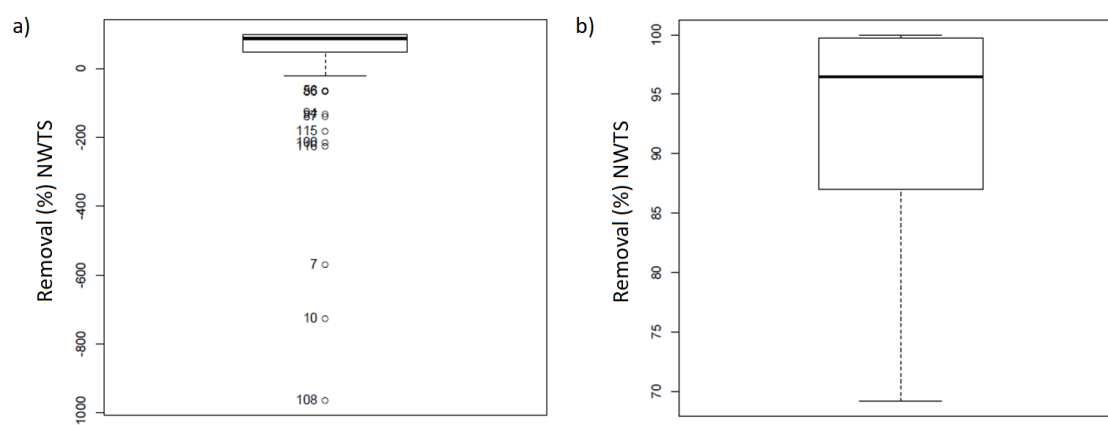


Figure S1. Box-plots of obtained removals during the whole study. (a) Preliminary identification of removal outliers for the NWTs; (b) Distribution of removals after the elimination of outliers for the NWTs.

Table S3. Values of PNEC of the target pharmaceuticals for *Daphnids* and algae.

	PNEC ($\mu\text{g}\cdot\text{L}^{-1}$) <i>daphnids</i>	PNEC ($\mu\text{g}\cdot\text{L}^{-1}$) algae	Source
Nicotine	0.1	1	[1]
Atenolol	83	78	[2]
Trimethoprim	121	16	[3]
Paraxanthine	178	100	[4]
Caffeine	46	46	[5]
Erythromycin	0.02	4.3	[3]
Carbamazepine	76.3	85	[3]
Naproxen	15	22	[3]
Ibuprofen	9.02	4	[3]
Diclofenac	22	14.5	[3]
Gemfibrozil	10.4	4	[3]

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