Supplemental Material for: Treatment and reuse of a pesticide-containing wastewater by a combination of physicochemical, biological and membrane processes

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S.1 Supplementary Equations

S.1.1 Volumetric Flux through Ultrafiltration Membranes

$$J_w = \frac{V}{A.\Delta t} \quad \text{(S1)}$$

where J_w is the water flux (L/m^2·h), V is the permeate volume, A is the effective membrane area, and Δt is the permeation time interval [36,37].

S.2 Supplementary Tables

Table S1. Main characteristics of the UF membranes used in this work, as informed by the supplier.

Membrane Code	Membrane Material[a]	Backing Material[a]	M.W.C.O (kDa)[a]	Thickness (µm) [a]	Permeability (L/m^2.h.bar)	Contact angle
UP010 P	PES	Polypropylene	10	210 - 250	≥ 50[a]	74±1.3[b]
UH050 P	PESH	Polypropylene	50	210 - 250	≥ 85[a]	66.72±1.31[c]

PES – Polyethersulfone; PEHS - Hydrophilic Polyethersulfone; M.W.C.O. – molecular weight cut-off
[a] information obtained from MICRODYN-NADIR
[b] Wang et al. (2018) (https://doi.org/10.1016/j.cej.2017.12.078)
[c] Elcik et al. (2016) (http://dx.doi.org/10.1016/j.memsci.2015.10.043)

Table S2. Physicochemical characteristics of raw aqueous matrices River, RM and RML, fed to the RO pretreatment train.

Parameter	Unit	River (River Lot 1)	RM (85:15) (River Lot 2)	RML (80:15:5) (River Lot 3)
COD	mg/L	74 ± 1	38 ± 1	47 ± 7
sCOD	mg/L	72 ± 2	23 ± 2	23 ± 1
TOC	mg/L	15.1	5.2	7.7
NH_4^+-N	mg/L	31	19	20
TSS	mg/L	35	50	23
VSS	mg/L	27	35	3
Turbidity	NTU	15.47	10.70	12.50
Color	Pt-Co units	158	79	73
pH	-	7.57	7.66	7.21
Condutivity	µS/cm	622.3	690.4	617.8

S.3 Supplementary Figures

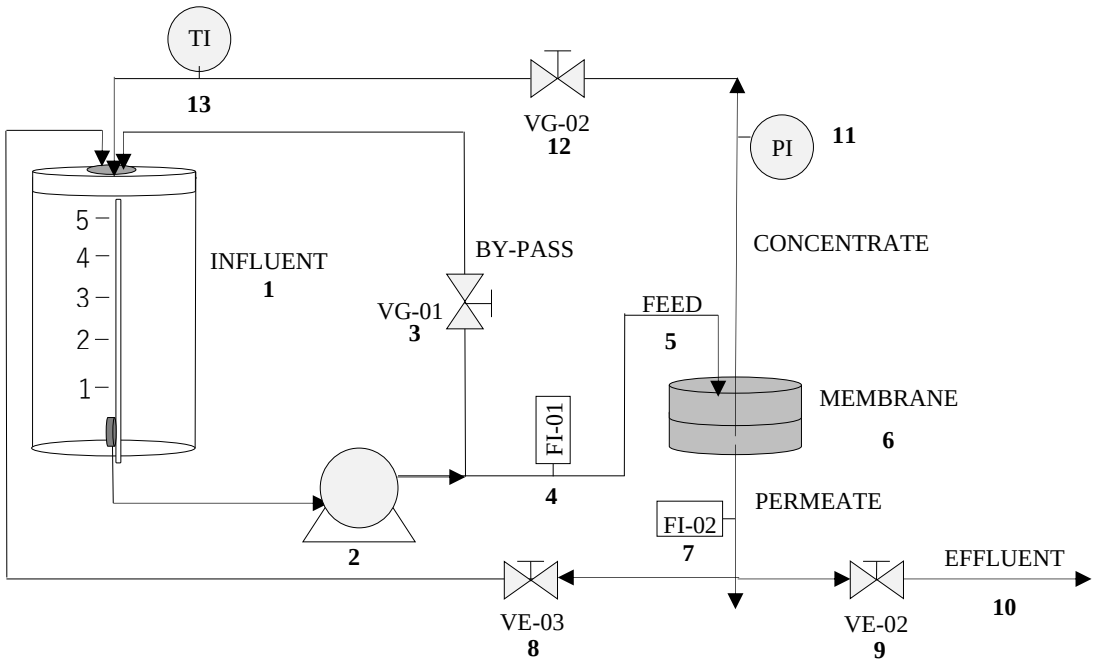
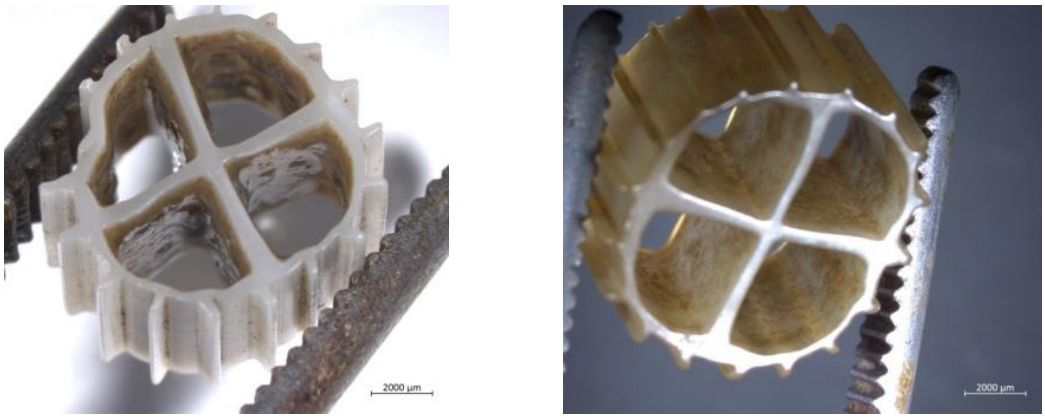


Fig. S1. Ultrafiltration experimental set up: (1) feed tank (influent), (2) pump, (3) control valve (by-pass), (4) flowmeter (feed), (5) UF feed, (6) UF membrane, (7) flowmeter (permeate), (8) and (9) control valve (permeate), (10) effluent stream, (11) pressure gauge, (12) pressure adjustment valve (concentrate), (13) thermometer.



(a) (b)

Fig. S2. Biomedia photographs with attached biomass when the MBBR was fed with (a) Mix_w and (b) SE. (color)

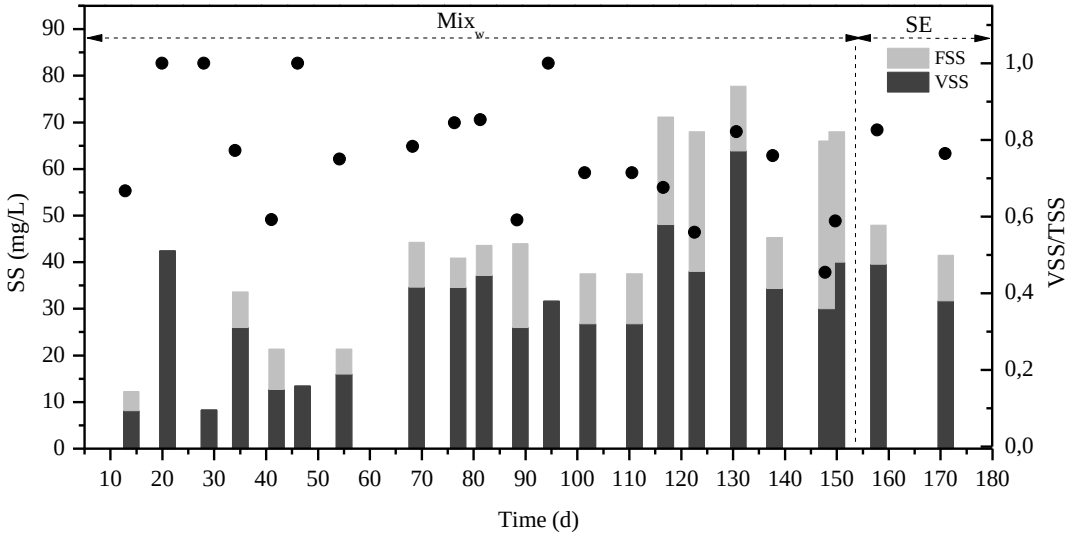


Fig. S3. Concentration of volatile (VSS) and fixed (FSS) suspended solids (columns) and SSV/SST ratio (●). TSS = VSS+FSS.

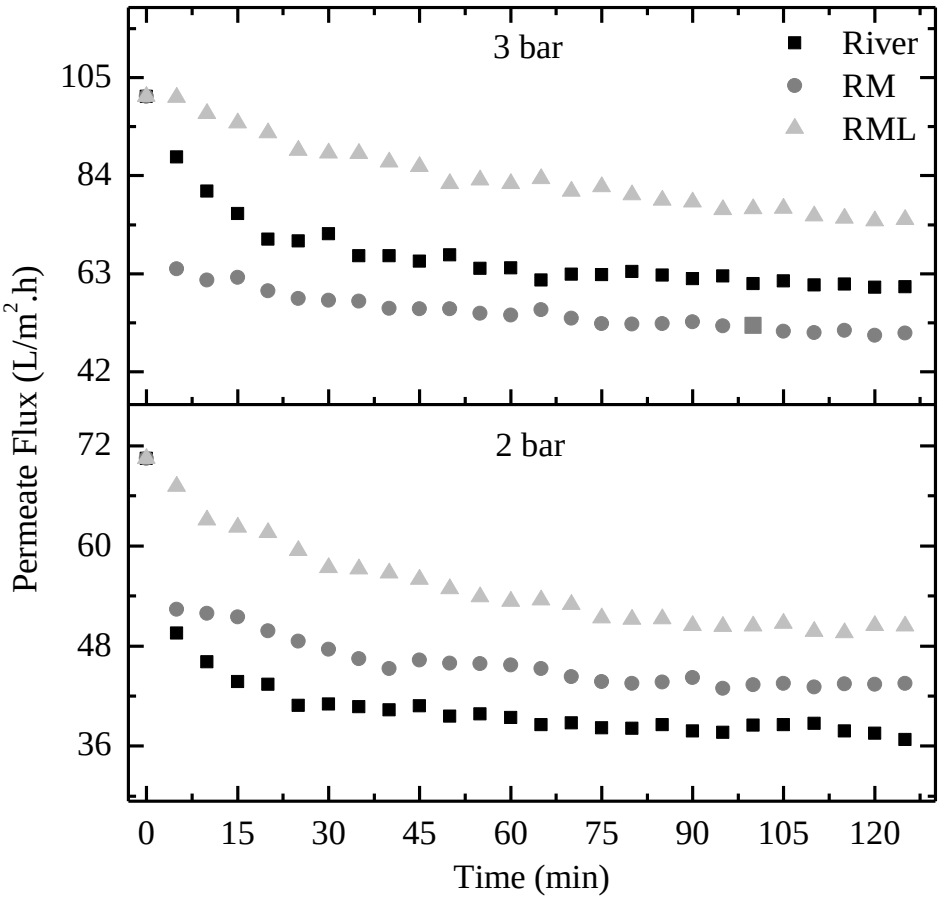


Fig. S4. Permeate flux of UP010 P membranes tested over time at different pressures.

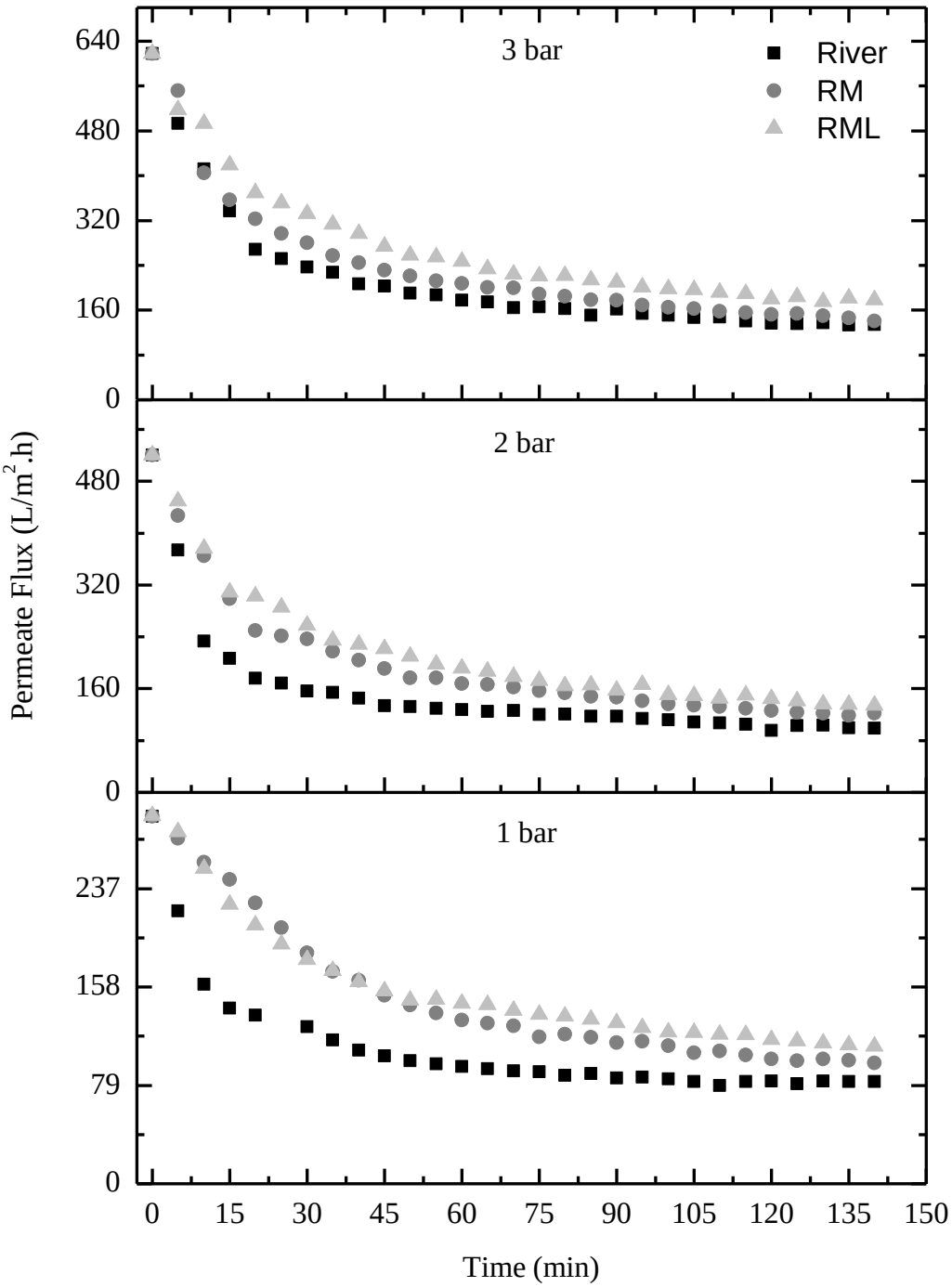
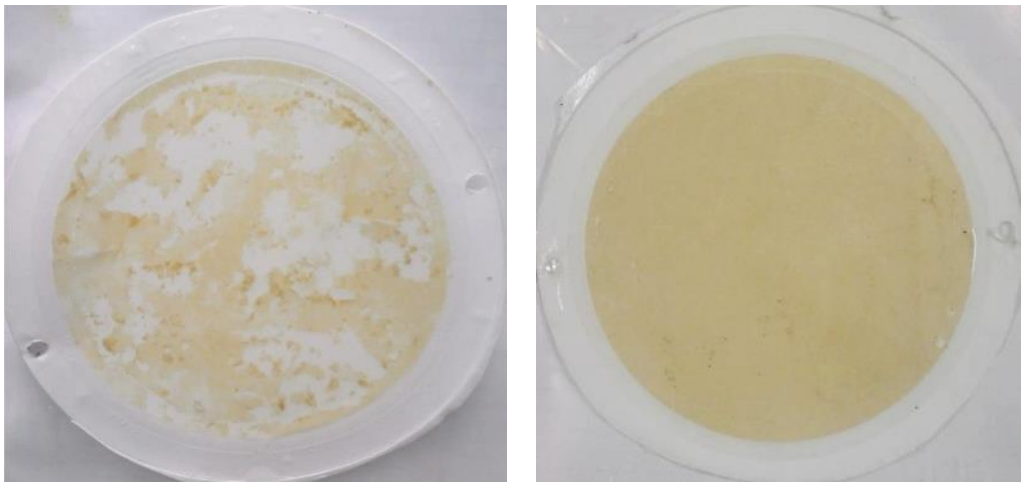


Fig. S5. Permeate flux of UH050 P membranes tested over time at different pressures.



(a) (b)

Fig. S6. Photographs of the UF membranes (a) UP010 P and (b) UH050 P after permeation with River (2 bar) and RML (3 bar) aqueous matrices, respectively. (color)