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Supporting Information

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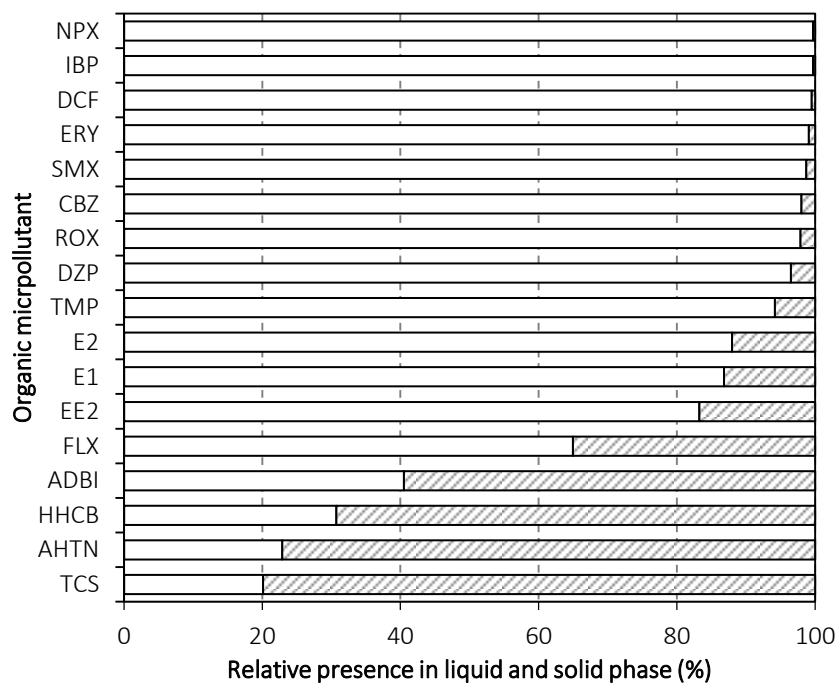


Figure S1. Relative presence of OMPs in the liquid (□) and solid (▨) phases of urban wastewater. Sorbed concentrations were calculated from the K_D values reported in Table 1.

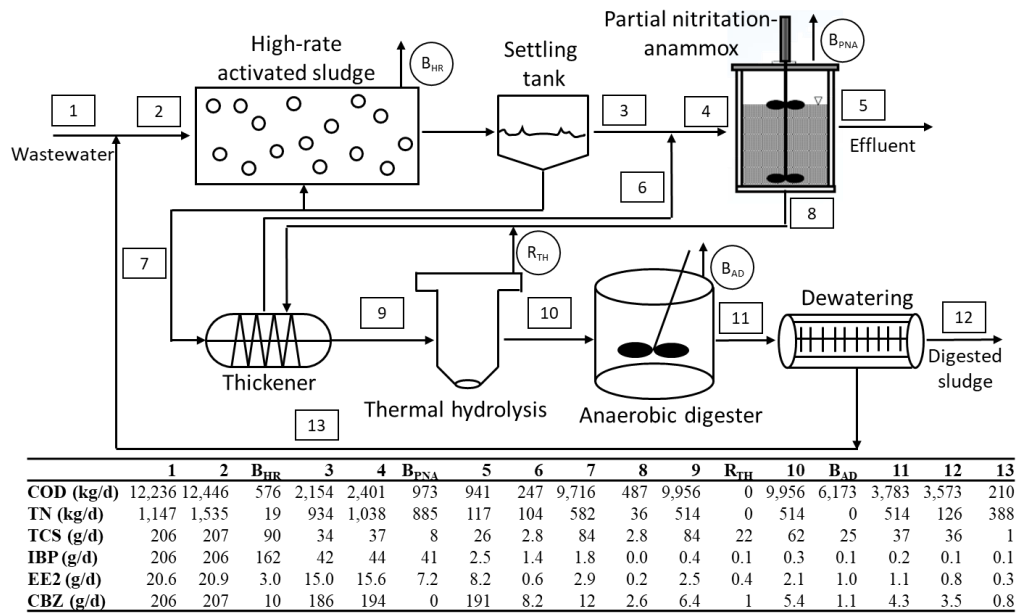


Figure S2. Mass balance of COD, TN and example of OMP of each type in the HRAS-based STP. B_{HR} : biotransformation in high-rate activated sludge reactor, B_{PNA} : biotransformation in partial nitrification-anammox reactor, R_{TH} : removal in thermal hydrolysis, B_{AD} : biotransformation in anaerobic digestion.

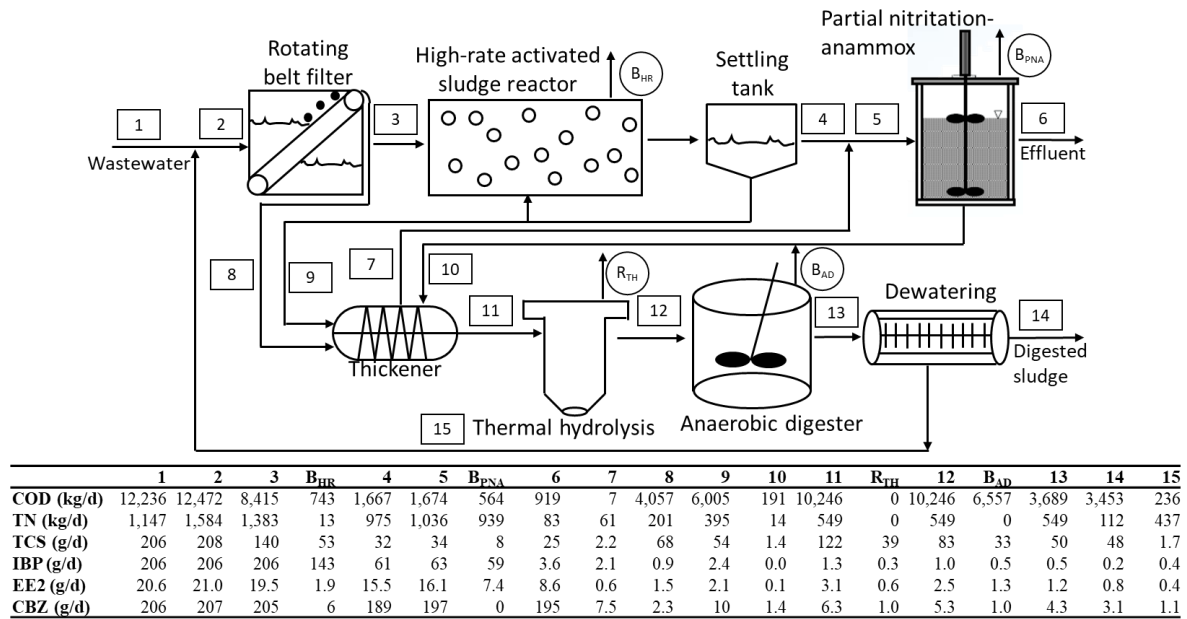
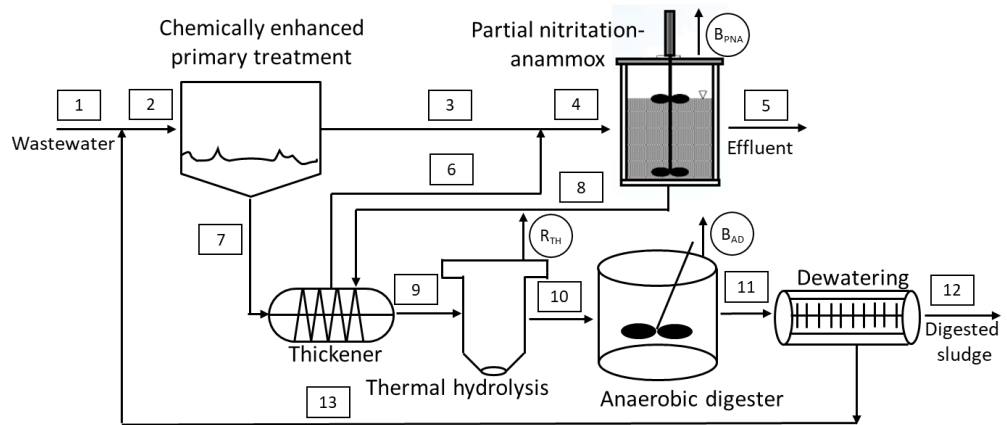


Figure S3. Mass balance of COD, TN and example of OMP of each type in the RBF+HRAS-based STP. B_{HR} : biotransformation in high-rate activated sludge reactor, B_{PNA} : biotransformation in partial nitritation-anammox reactor, R_{TH} : removal in thermal hydrolysis, B_{AD} : biotransformation in anaerobic digestion.



	1	2	3	4	B_{PNA}	5	6	7	8	9	R_{TH}	10	B_{AD}	11	12	13
COD (kg/d)	12,236	12,462	877	938	371	567	0	11,585	0	11,585	0	11,585	6,719	4,866	4,640	226
TN (kg/d)	1,147	1,501	960	1,021	874	86	61	541	0	480	0	480	0	480	126	354
TCS (g/d)	206	209	44	44	10	34	0	165	0	165	30	135	54	81	78	2.6
IBP (g/d)	206	207	205	205	193	12	0	2.1	0	2.1	0.2	1.9	0.9	1.0	0.4	0.6
EE2 (g/d)	20.6	21.0	17.5	17.5	8.2	9.3	0.0	3.5	0.0	3.5	0.4	3.1	1.6	1.5	1.1	0.4
CBZ (g/d)	206	207	202	202	0	202	0	5.5	0	5.5	0.7	4.8	0.9	3.9	3.0	0.9

Figure S4. Mass balance of COD, TN and example of OMP of each type in the CEPT-based STP. B_{PNA} : biotransformation in partial nitrification-anammox reactor, R_{TH} : removal in thermal hydrolysis, B_{AD} : biotransformation in anaerobic digestion.

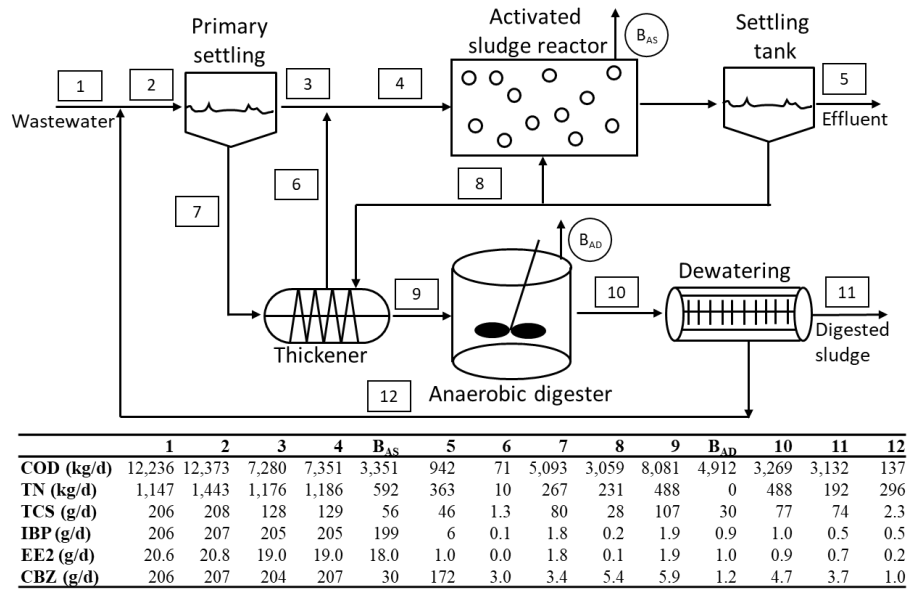


Figure S5. Mass balance of COD, TN and example of OMP of each type in the conventional STP. B_{AS} : biotransformation in activated sludge reactor, B_{AD} : biotransformation in anaerobic digestion.

SENSITIVITY ANALYSIS

A global sensitivity analysis was carried out to determine what parameters have a higher influence on the effluent and sludge OMP content. The method of standardised regression coefficients (SRC) was chosen, consisting on fitting a first order linear multivariable model between the predictions and the parameter values (θ_i) by a least squares method (Saltelli et al., 2008):

$$y_k = b_{k,0} + \sum_i b_{k,i} \cdot \theta_i \quad (12)$$

where y_k are the content of OMP k in a given stream, $b_{k,0}$ and $b_{k,i}$ are the linear regression coefficients and θ_i the parameters, with index k varying from 1 to the number of OMP and index i from 1 to the number of parameters. To assume the model linear, the squared coefficient of correlation (R^2) between the Monte Carlo simulation output (Y) and the values produced with the regression model with the estimated SRC (Eq. 9) regressed linear output should be above 0.7 (Vangsgaard et al., 2012), which was confirmed for all the cases analysed. After standardisation of the outputs and parameters, the absolute magnitude of the regression coefficients indicates the sensitivity of the outputs to a given parameter and, therefore, can be used to rank the parameters with a higher influence on the predictions. Only those parameters with an expected influence larger than 5% were retained for further analysis.

Table S1. Factors with an influence larger than 5% on the OMP removal efficiency from wastewater.

OMP	Wastewater treatment plant configuration			
	HRAS	RBF+HRAS	CEPT	Conventional
AHTN	k_{biol} HRAS/PN-AMX reactor K_D HRAS reactor	k_{biol} HRAS/PN-AMX reactor K_D HRAS reactor	k_{biol} PN-AMX reactor	k_{biol} CAS reactor
ADBI	k_{biol} HRAS/PN-AMX reactors	k_{biol} HRAS/PN-AMX reactors	k_{biol} PN-AMX reactor	k_{biol} CAS reactor
HHCB	k_{biol} HRAS/PN-AMX reactors K_D HRAS reactor	k_{biol} HRAS/PN-AMX reactors K_D HRAS reactor	k_{biol} PN-AMX reactor	k_{biol} CAS reactor
TCS	k_{biol} HRAS/PN-AMX reactors K_D HRAS reactor	k_{biol} HRAS/PN-AMX reactors K_D HRAS reactor	k_{biol} PN-AMX reactor	K_D CAS reactor
DCF	k_{biol} HRAS/PN-AMX reactors	k_{biol} HRAS/PN-AMX reactors	k_{biol} PN-AMX reactor	k_{biol} CAS reactor
IBP	k_{biol} HRAS/PN-AMX reactors	k_{biol} HRAS/PN-AMX reactors	k_{biol} PN-AMX reactor	k_{biol} CAS reactor
NPX	k_{biol} HRAS reactor	k_{biol} HRAS reactor	-	k_{biol} CAS reactor
ERY	k_{biol} HRAS reactor	k_{biol} HRAS reactor	-	k_{biol} CAS reactor
ROX	k_{biol} HRAS reactor	k_{biol} HRAS reactor	k_{biol} PN-AMX reactor	k_{biol} CAS reactor
TMP	k_{biol} HRAS/PN-AMX reactors	k_{biol} HRAS/PN-AMX reactors	k_{biol} PN-AMX reactor	k_{biol} CAS reactor
SMX	k_{biol} HRAS/PN-AMX reactors	k_{biol} HRAS/PN-AMX reactors	k_{biol} PN-AMX reactor	k_{biol} CAS reactor
FLX	k_{biol}/K_D HRAS reactor K_D AD	k_{biol}/K_D HRAS reactor	K_D AD	k_{biol} CAS reactor
CBZ	k_{biol} HRAS reactor	k_{biol} HRAS reactor	K_D AD	k_{biol} CAS reactor
DZP	k_{biol} HRAS/PN-AMX reactors	k_{biol} HRAS/PN-AMX reactors	K_D AD	k_{biol} CAS reactor
E1	k_{biol} HRAS/PN-AMX reactors	k_{biol} HRAS/PN-AMX reactors	k_{biol} PN-AMX reactor	k_{biol} CAS reactor
E2	k_{biol} HRAS/PN-AMX reactors	k_{biol} HRAS/PN-AMX reactors	k_{biol} PN-AMX reactor	k_{biol} CAS reactor
EE2	k_{biol} HRAS/PN-AMX reactors	k_{biol} PN-AMX reactor	k_{biol} PN-AMX reactor	k_{biol} CAS reactor

Table S2. Factors with an influence larger than 5% on the OMP presence in digested sludge.

OMP	Wastewater treatment plant configuration			
	HRAS	RBF+HRAS	CEPT	Conventional
AHTN	k_{biol}/K_D HRAS reactor	-	-	k_{biol} CAS reactor K_D AD
ADBI	k_{biol}/K_D HRAS reactor	k_{biol}/K_D HRAS reactor K_D AD	K_D AD	k_{biol}/K_D CAS reactor K_D AD
HHCB	k_{biol}/K_D HRAS reactor	K_D HRAS reactor	-	-
TCS	k_{biol}/K_D HRAS reactor	-	-	K_D CAS reactor
DCF	-	-	-	
IBP	k_{biol}/K_D HRAS reactor K_D AD	k_{biol}/K_D HRAS reactor K_D AD	K_D AD	K_D AD
NPX	K_D HRAS reactor K_D AD	K_D AD	K_D AD	K_D AD
ERY	K_D HRAS reactor K_D AD	K_D AD	K_D CEPT K_D AD	K_D AD
ROX	k_{biol}/K_D HRAS reactor K_D AD	K_D AD	K_D AD	k_{biol}/K_D CAS reactor K_D AD
TMP	K_D AD	K_D AD	K_D AD	K_D AD
SMX	K_D HRAS reactor K_D AD	K_D AD	K_D CEPT K_D AD	K_D AD
FLX	K_D HRAS reactor K_D AD	K_D AD	K_D AD	k_{biol}/K_D CAS reactor K_D AD
CBZ	K_D HRAS reactor K_D AD	K_D HRAS reactor K_D AD	K_D CEPT K_D AD	K_D CAS reactor K_D AD
DZP	K_D HRAS reactor K_D AD	K_D AD	K_D CEPT K_D AD	K_D CAS reactor K_D AD
E1	k_{biol}/K_D HRAS reactor K_D AD	K_D AD	K_D AD	k_{biol} CAS reactor K_D AD
E2	k_{biol} HRAS reactor	K_D AD	-	k_{biol} CAS reactor
EE2	K_D AD	K_D AD	K_D AD	K_D AD