

## Supporting materials

**Table S1** The information of 39 targeted PPCPs and corresponding isotopically labeled standards in this study

No.	Compounds	Abbreviation	Category	MDL (ng/L)	MQL (ng/L)	Isotopically labeled surrogate standard	Abbreviation of isotopically labeled surrogate standard
1	Nalidixic acid	NA	antibiotics	0.25	0.99	<sup>13</sup> C-Phenacetin	13C-Phenacetin
2	Trimethoprim	TP	antibiotics	0.16	0.65	D <sub>3</sub> -Trimethoprim	D3-TP
3	Propranolol	PPN	β-blocking drug	0.15	0.60	D <sub>7</sub> -Propranolol	D7-PPN
4	Carbamazepin	CBZ	anticonvulsants	0.28	1.13	D <sub>10</sub> -Carbamazepin	D10-CBZ
5	N,N-diethyl-m-toluamide	DEET	insecticide	0.25	1.00	D <sub>6</sub> -N,N-diethyl-m-toluamide	D6-DEET
6	(S)-(-)-Sulpiride	SP	antidepressants	0.34	1.37	D <sub>3</sub> -Trimethoprim	D3-TP
7	Metoprolol	MTP	β-blocking drug	2.84	11.37	<sup>13</sup> C-Phenacetin	13C-Phenacetin
8	Caffeine	CF	analeptics	0.86	3.42	<sup>13</sup> C-Phenacetin	13C-Phenacetin
9	Enrofloxacin	ENR	antibiotics	0.63	2.52	D <sub>5</sub> -Enrofloxacin	D5-ENR
10	Ciprofloxacin	CIP	antibiotics	3.80	15.19	D <sub>5</sub> -Enrofloxacin	D5-ENR
11	Ofloxacin	OFL	antibiotics	0.47	1.87	D <sub>5</sub> -Enrofloxacin	D5-ENR
12	Norfloxacin	NOR	antibiotics	2.54	10.17	D <sub>5</sub> -Enrofloxacin	D5-ENR
13	Diclofenac acid	DF	antiphlogistics analgesics	1.29	5.14	D <sub>4</sub> -Diclofenac	D4-DF
14	Indomethacine	IM	antiphlogistics analgesics	1.08	4.31	Clofibric acid (CA-D <sub>4</sub> )/2-(4-Chlorophenoxy)-2-methylpropionic acid	D4-CA
15	Mefenamic acid	MA	antiphlogistics analgesics	1.07	4.27	D <sub>3</sub> -Mefenamic acid	D3-MA
16	Ketoprofen	KP	antiphlogistics analgesics	1.90	7.60	<sup>13</sup> C-Ketoprofen	C13-KP
17	Bezafibrate	BF	blood lipid regulator	1.35	5.38	D <sub>4</sub> -Bezafibrate	D4-BF

18	Clofibric acid	CA	blood lipid regulator	2.32	9.28	Clofibric acid (CA-D <sub>4</sub> )/2-(4-Chlorophenoxy)-2-methylpropionic acid	D4-CA
19	Gemfibrozil	GF	blood lipid regulator	3.09	12.35	Clofibric acid (CA-D <sub>4</sub> )/2-(4-Chlorophenoxy)-2-methylpropionic acid	D4-CA
20	Ibuprofen	IBU	antiphlogistics analgesics	2.22	8.89	Clofibric acid (CA-D <sub>4</sub> )/2-(4-Chlorophenoxy)-2-methylpropionic acid	D4-CA
21	Sulfadiazine	SD	antibiotics	0.20	0.80	D <sub>4</sub> -Sulfadiazine	D4-SD
22	Sulfathiazole	ST	antibiotics	0.30	1.18	D <sub>4</sub> -Sulfathiazole	D4-ST
23	Sulfamerazine	SMR	antibiotics	0.38	1.51	<sup>13</sup> C <sub>6</sub> -Sulfamethazine	13C6-SMT
24	Sulfisoxazole	SIX	antibiotics	0.09	0.35	<sup>13</sup> C <sub>6</sub> -Sulfisoxazole	13C6-SIX
25	Sulfisomidin sodium	SIM	antibiotics	0.39	1.58	<sup>13</sup> C <sub>6</sub> -Sulfamethazine	13C6-SMT
26	Sulfamethoxypyridazine	SMP	antibiotics	0.50	2.01	D <sub>3</sub> -Sulfamethoxypyridazine	D3-SMP
27	Sulfaquinoxaline	SQX	antibiotics	2.03	8.11	<sup>13</sup> C <sub>6</sub> -Sulfamethazine	13C6-SMT
28	Sulfamethazine	SMT	antibiotics	0.26	1.05	<sup>13</sup> C <sub>6</sub> -Sulfamethazine	13C6-SMT
29	Sulfadimethoxine	SDM	antibiotics	0.34	1.36	<sup>13</sup> C <sub>6</sub> -Sulfamethazine	13C6-SMT
30	Sulfamethoxazole	SMX	antibiotics	0.24	0.97	<sup>13</sup> C <sub>6</sub> -Sulfamethizol	13C6-SMZ
31	Sulfamethizol	SMZ	antibiotics	0.31	1.23	<sup>13</sup> C <sub>6</sub> -Sulfamethizol	13C6-SMZ
32	Sulfamonomethoxine	SM	antibiotics	0.35	1.42	<sup>13</sup> C <sub>6</sub> -Sulfamethazine	13C6-SMT
33	Acetaminophen	ATP	antipyretics	0.38	1.51	<sup>13</sup> C <sub>2</sub> -Erythromycin	C2-EM
34	Erythromycin	EM	antibiotics	0.90	3.58	<sup>13</sup> C <sub>2</sub> -Erythromycin	C2-EM
35	Clarithromycin	CAM	antibiotics	0.38	1.51	D <sub>7</sub> -Roxithromycin	D7-RXM
36	Roxithromycin	RXM	antibiotics	0.59	2.38	D <sub>7</sub> -Roxithromycin	D7-RXM
37	Tylosin tartrate	TS	antibiotics	0.90	3.59	D <sub>7</sub> -Roxithromycin	D7-RXM
38	Clindamycin hydrochloride	CDM	antibiotics	0.18	0.73	<sup>13</sup> C <sub>2</sub> -Erythromycin	C2-EM
39	Lincomycin hydrochloride	LCM	antibiotics	0.21	0.85	<sup>13</sup> C <sub>2</sub> -Erythromycin	C2-EM

**Table S2** The gradient elution program of HPLC

Time (min)	A (%)	B (%)	Flow (mL/min)
15	95	5	0.4
19	95	5	0.4
19.01	5	95	0.4
25	5	95	0.4

**Table S3** The MS/MS parameters of the target compounds

Compound	Precursor ion (m/z)	Product ion (m/z)	Dwell	Frag (V)	CE (V)	Cell Acc (V)	Polarity
NA	233	215	5	89	13	4	Positive
NA	233	186.9	5	89	29	4	Positive
TP	291.1	261	5	145	29	4	Positive
TP	291.1	230	5	145	25	4	Positive
PPN	260.1	116	5	122	17	4	Positive
PPN	260.1	56.1	5	122	33	4	Positive
CBZ	237	194	5	125	21	4	Positive
CBZ	237	178.9	5	125	41	4	Positive
DEET	192.1	119	5	120	17	4	Positive
DEET	192.1	91	5	120	37	4	Positive
SP	342.1	213.9	5	140	37	4	Positive
SP	342.1	112	5	140	29	4	Positive
MTP	268.1	116	5	127	21	4	Positive
MTP	268.1	74.1	5	127	25	4	Positive
CF	194.9	138	5	120	21	4	Positive
CF	194.9	42.2	5	120	45	4	Positive
ENR	360.1	342.1	5	130	25	4	Positive
ENR	360.1	316.1	5	130	21	4	Positive
CIP	332.1	314.1	5	130	21	4	Positive
CIP	332.1	231	5	130	49	4	Positive
OFL	362	318.1	5	140	21	4	Positive
OFL	362	261	5	140	29	4	Positive
NOR	320	302.1	5	130	25	4	Positive
NOR	320	276.1	5	130	17	4	Positive
DF	293.9	249.9	5	76	9	4	Negative
DF	293.9	213.9	5	76	21	4	Negative
IM	356	312	5	85	5	4	Negative
IM	356	297	5	85	17	4	Negative
MA	240	196	5	105	17	4	Negative
MA	240	192	5	105	29	4	Negative
KP	253	209	5	70	5	4	Negative

BF	360	274	5	103	17	4	Negative
BF	360	153.9	5	103	33	4	Negative
CA	212.9	126.9	5	73	17	4	Negative
CA	212.9	85	5	73	5	4	Negative
GF	249	121	5	76	21	4	Negative
IBU	204.9	161.1	5	66	5	4	Negative
SD	250.9	155.9	5	100	13	4	Positive
SD	250.9	92.1	5	100	33	4	Positive
ST	255.9	155.9	5	105	13	4	Positive
ST	255.9	92	5	105	29	4	Positive
SMR	265.1	155.9	5	115	17	4	Positive
SMR	265.1	92	5	115	33	4	Positive
SIX	267.9	155.9	5	105	13	4	Positive
SIX	267.9	92	5	105	33	4	Positive
SIM	279	185.9	5	125	17	4	Positive
SIM	279	124	5	125	25	4	Positive
SMP	280.9	155.9	5	115	17	4	Positive
SMP	280.9	92	5	115	33	4	Positive
SQX	298.9	144	5	160	37	4	Negative
SQX	298.9	142	5	160	41	4	Negative
SMT	278.9	185.9	5	120	17	4	Positive
SMT	278.9	92	5	120	33	4	Positive
SDM	310.9	156	5	115	21	4	Positive
SDM	310.9	92	5	115	41	4	Positive
SMX	254	155.9	5	104	17	4	Positive
SMX	254	92	5	104	29	4	Positive
SMZ	270.9	155.9	5	100	13	4	Positive
SMZ	270.9	92	5	100	33	4	Positive
SM	281	155.9	5	115	17	4	Positive
SM	281	92	5	115	37	4	Positive
ATP	152	110	5	95	17	4	Positive
ATP	152	65.1	5	95	33	4	Positive
EM	734.4	576.3	5	155	17	4	Positive
EM	734.4	158	5	155	29	4	Positive
CAM	748.4	590.3	5	165	21	4	Positive
CAM	748.4	158	5	165	29	4	Positive
RXM	837.4	679.3	5	165	21	4	Positive
RXM	837.4	558.3	5	165	25	4	Positive
TS	916.4	772.3	5	240	33	4	Positive
CDM	425.1	377.1	5	145	21	4	Positive
CDM	425.1	126.1	5	145	29	4	Positive
LCM	407.1	359.1	5	148	21	4	Positive
LCM	407.1	126.1	5	148	33	4	Positive

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**Table S4** Acceptable Daily Intake values used in estimation of the respective DWEL

PPCPs	ADI ( $\mu\text{g}/\text{kg}/\text{day}$ )	Toxicity endpoint	Reference
NA	500	rat NOEL of 50 mg/kg/d and UF = 100	ECOTOX (EPA)
KP	5	Therapeutic dose	Webb et al., 2003
CBZ	0.3	Carcinogenicity in rats	Bruce et al., 2010
DEET	500	rat NOEL of 50 mg/kg/d and UF = 100	ECOTOX (EPA)
MTP	1000	Lowest therapeutic dose of 100 mg/d and UF = 100	Houtman et al., 2014
CF	150	Developmental effects in rats	Skalko et al., 1984
IBU	110	Lowest single effective therapeutic dose	Schwab et al., 2005
SD	20	Not available	de Jesus Gaffney et al., 2015
SIX	667	Maximum recommended therapeutic dose of 66.7 mg/kg/d and UF = 100	ECOTOX(EPA)
SMX	130	Thyroid tumors in rats	Schwab et al., 2005
ATP	340	Lowest single effective therapeutic dose	Schwab et al., 2005
OFL	5.7	NOEL	Damásio et al., 2011
RXM	14.5	LC50	Damásio et al., 2011

**Table S5** Selected age group with respective 50% of body weight and drinking water intakes

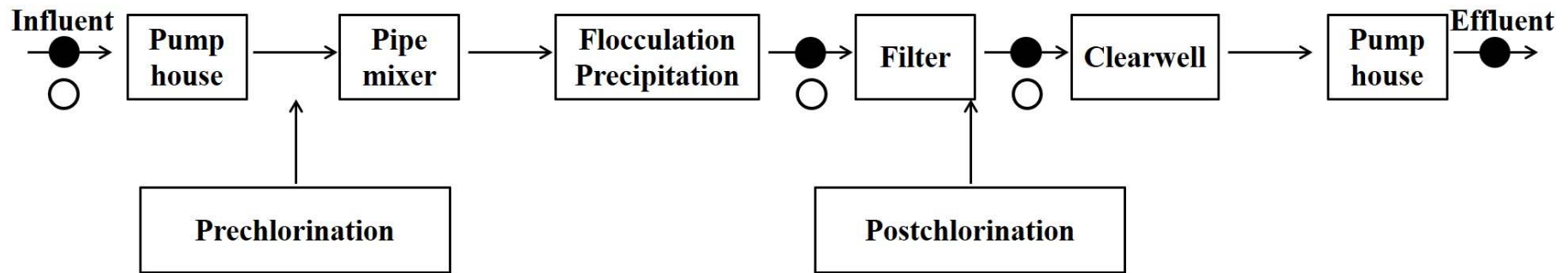
Age group	BW (Bodyweight) (kg)	DWI (Drinking Water Intake) (L/day)
0–3 month	5.6	1.15
3–6 month	7.2	1.14
6–12 month	9.4	1.18
1–2 years	12	0.85
2–3 years	13.8	0.83
3–6 years	19	1.16
6–11 years	36	1.55
11–16 years	56	1.9
16–18 years	57	1.77
Adults( $\geq 18$ years)	60	2.04

**Table S6** logK<sub>ow</sub> and pK<sub>a</sub> of PPCPs

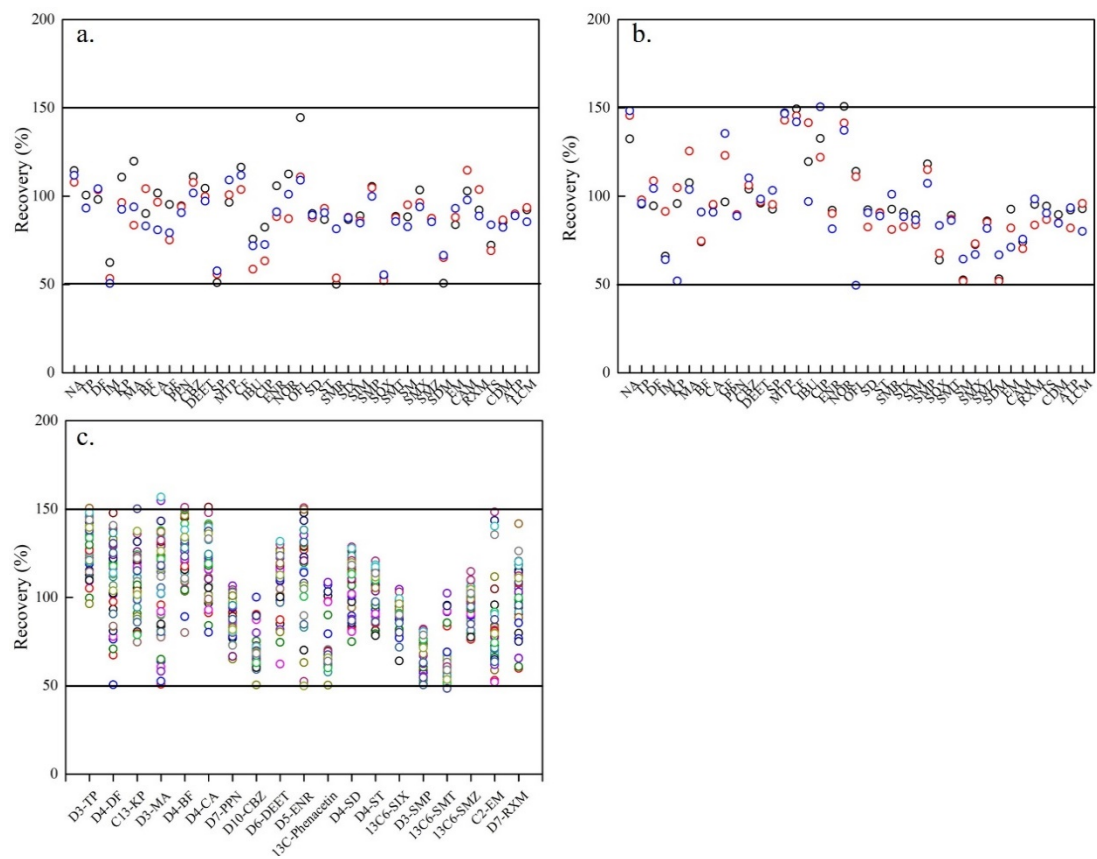
Parameter	NA	KP	CBZ	DEET	MTP	CF	IBU	OFL	SD	SMX	ATP
logK <sub>ow</sub>	1.41	3.12	2.45	2.38	1.69	-0.07	3.97	-0.39	1.36	0.89	0.46
pK <sub>a</sub>	6.1	4.5	7	0.8	9.7	10.4	4.9	5.77	6.48	5.94	9.5

**Table S7** Effluent quality of the DWTP

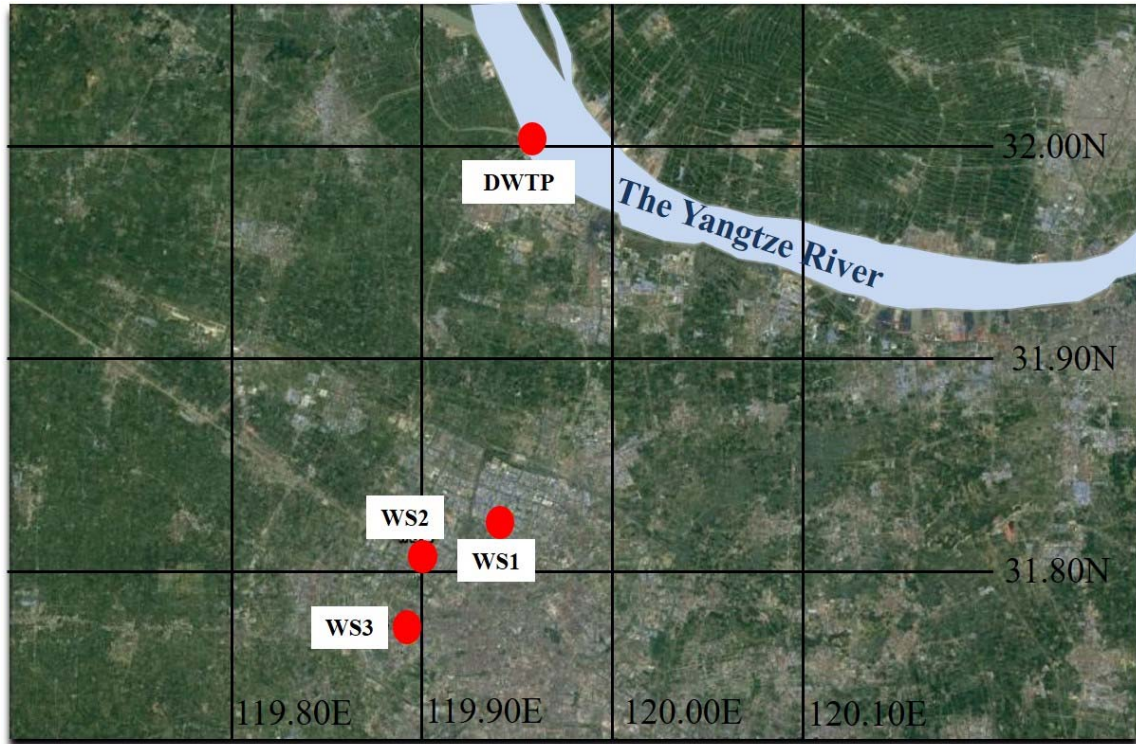
Water quality index	Turbidity	pH	Total hardness	TDS	Ammonia nitrogen	Oxygen consumption	Total colony	Residual chlorine
	NTU		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(CFU/mL)	(mg/L)
Effluent of DWTP	0.10	7.60	121	202	< 0.02	1.2	ND	0.60
Limit(GB5749-2006)	1	6.5-8.5	450	1000	0.5	3	100	≥ 0.3 mg/L



**Fig. S1** Schematic diagram of the treatment processes in the DWTP and sampling sites (●Grab samples;○Continuous samples)



**Fig. S2** Recovery rates of target compounds and isotopically labeled surrogate standards: (a) Recovery rates of target compounds in ultrapure water; (b) Recovery rates of target compounds in samples; (c) Recovery rates of isotopically labeled surrogate standards in all samples



**Fig. S3** The DWTP and three water supply stations in this study (WS: water supply station)

## References

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