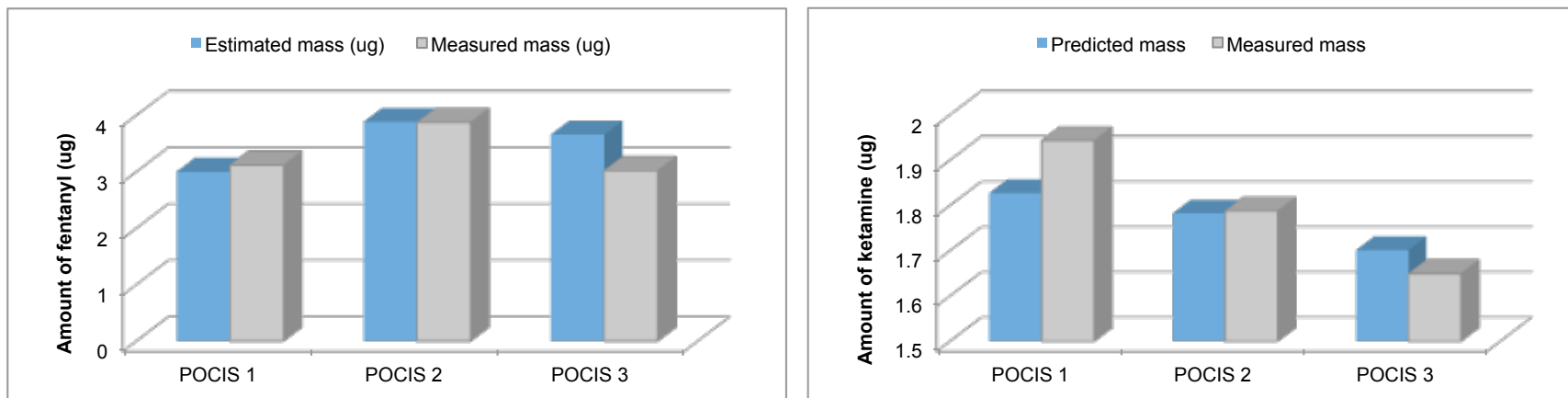


## Supplemental material

**Figure S1.** Comparison of estimated and measured amounts of the target compounds retained by the POCIS sorbent



## Supplemental material

**Table S1.** Chemical formulae, corresponding deuterated analogs, SPE recoveries, POCIS extraction efficiencies and POCIS sampling rates of target compounds

Target Compounds	Chemical Formula	Deuterated Analog	WW, SW & DW <sup>a</sup> SPE Recovery (%)	POCIS Analyte Recovery (%)	POCIS Sampling Rate <sup>b</sup> (Ld <sup>-1</sup> ) (Mean R <sub>s</sub> ±SD)
<b>Cocaine, benzoylecgonine and sucralose</b>					
Cocaine	C <sub>17</sub> H <sub>21</sub> NO <sub>4</sub>	Cocaine-d3	90, 92, 92	89	0.230±0.036
Benzoylecgonine	C <sub>16</sub> H <sub>19</sub> NO <sub>4</sub>	Benzoylecgonine-d3	96, 95, 96	85	0.134±0.011
Sucralose	C <sub>12</sub> H <sub>19</sub> Cl <sub>3</sub> O <sub>8</sub>	Sucralose-d6	87, NA <sup>d</sup> , 79	87	0.160
<b>Amphetamine-type stimulants</b>					
Amphetamine	C <sub>9</sub> H <sub>13</sub> N	Amphetamine-d5	98, 98, 99	93	0.201±0.038
Methamphetamine	C <sub>10</sub> H <sub>15</sub> N	Methamphetamine-d9	99, 99, 99	91	0.231±0.025
MDA	C <sub>10</sub> H <sub>13</sub> NO <sub>2</sub>	MDA-d5	95, 94, 95	90	0.288±0.021
MDMA	C <sub>11</sub> H <sub>15</sub> NO <sub>2</sub>	MDMA-d5	95, 96, 96	91	0.222±0.013
Ephedrine	C <sub>10</sub> H <sub>15</sub> NO	Ephedrine-d3	88, 89, 89	83	0.123±0.039
<b>Opioid drugs</b>					
Codeine	C <sub>18</sub> H <sub>21</sub> NO <sub>3</sub>	Codeine-d3	87, 86, 89	82	0.394±0.049
Acetylcodeine	C <sub>20</sub> H <sub>23</sub> NO <sub>4</sub>	Acetylcodeine-d9	86, 87, 89	85	NA <sup>c</sup>
Dihydrocodeine	C <sub>18</sub> H <sub>23</sub> NO <sub>3</sub>	Dihydrocodeine-d6	86, 85, 86	81	0.110±0.041
Morphine	C <sub>17</sub> H <sub>19</sub> NO <sub>3</sub>	Morphine-d3	90, 91, 91	88	0.261±0.036
Acetylmorphine	C <sub>19</sub> H <sub>21</sub> NO <sub>5</sub>	Acetylmorphine-d3	85, 86, 84	82	NA <sup>c</sup>
Methadone	C <sub>21</sub> H <sub>27</sub> NO	Methadone-d9	90, 91, 91	86	0.408±0.147
Heroin	C <sub>21</sub> H <sub>23</sub> NO <sub>5</sub>	Heroin-d9	87, 86, 86	84	NA <sup>c</sup>
Tramadol	C <sub>16</sub> H <sub>25</sub> NO <sub>2</sub>	Tramadol-d6	83, 82, 83	82	0.241±0.062
Ketamine	C <sub>13</sub> H <sub>16</sub> ClNO	Ketamine-d4	82, 84, 85	83	0.197±0.007
Oxycodone	C <sub>18</sub> H <sub>21</sub> NO <sub>4</sub>	Oxycodone-d3	88, 89, 90	84	0.152±0.039
EDDP	C <sub>20</sub> H <sub>24</sub> N ClO <sub>4</sub>	EDDP-d3	86, 88, 88	82	0.532±0.193
Fentanyl	C <sub>22</sub> H <sub>28</sub> N <sub>2</sub> O	Fentanyl-d5	81, 82, 82	81	0.390±0.051

<sup>a</sup> WW=wastewater, SW=surface water, DW=drinking water

<sup>b</sup> Taken from Yargeau et al. 2014 with the exception of sucralose taken from Metcalfe et al. 2014 and ketamine and fentanyl R<sub>s</sub> determined in this work.

<sup>c</sup> Not available

**Supplemental material:**

**Table S2.** Limits of detection (LODs) and limits of quantification (LOQs) in wastewater, surface water and drinking water

Target compounds	Wastewater LOD, LOQ (ngL <sup>-1</sup> )	Surface water LOD, LOQ (ngL <sup>-1</sup> )	Drinking water LOD, LOQ (ngL <sup>-1</sup> )
<b>Cocaine, benzoylecgonine and sucralose</b>			
Cocaine	1.3, 4.2	1.1, 3.5	0.96, 3.2
Benzoylecgonine	1.3, 4.2	1.1, 3.5	0.96, 3.2
Sucralose	0.5, 1.4	Not available	0.10, 0.30
<b>Amphetamine-type stimulants</b>			
Amphetamine	1.1, 3.5	0.88, 2.9	0.80, 2.7
Methamphetamine	2.1, 6.9	1.72, 5.7	1.6, 5.2
MDA	1.0, 3.2	0.80, 2.7	0.73, 2.4
MDMA	2.5, 8.4	2.1, 7.0	1.9, 6.4
Ephedrine	1.7, 5.6	1.4, 4.7	1.3, 4.3
<b>Opioid Drugs</b>			
Codeine	0.91, 3.0	0.76, 2.5	0.69, 2.3
Acetylcodeine	1.5, 4.9	1.2, 4.1	1.1, 3.7
Dihydrocodeine	0.42, 1.4	0.35, 1.18	0.32, 1.1
Morphine	0.27, 0.89	0.22, 0.74	0.20, 0.68
Acetylmorphine	0.14, 0.48	0.12, 0.40	0.11, 0.36
Methodone	21, 69	17, 57	16, 52
Heroin	1.8, 6.1	1.5, 5.1	1.4, 4.6
Tramadol	1.8, 5.8	1.5, 4.9	1.3, 4.4
Ketamine	0.51, 1.7	0.42, 1.4	0.39, 1.3
Oxycodone	1.4, 4.8	1.2, 4.0	1.1, 3.6
EDDP	22, 74	19, 62	17, 56
Fentanyl	1.1, 3.6	0.89, 3.0	0.81, 2.7

**Supplementary material:**

**Table S3.** Mean concentration (n=3, ±SD) in ngL<sup>-1</sup> estimated from amounts accumulated in POCIS, or determined from analysis of grab samples collected at the time of deployment and retrieval of the POCIS, respectively.

Compounds	Upstream 1		Upstream 2		WWTP Effluent		Downstream 1		Downstream 2		Downstream 3		DWTP Untreated		DWTP Treated	
	POCIS	Grab Deployment/ Retrieval	POCIS	Grab Deployment/ Retrieval	POCIS	Grab Deployment/ Retrieval	POCIS	Grab Deployment/ Retrieval	POCIS	Grab Deployment/ Retrieval	POCIS	Grab Deployment/ Retrieval	POCIS	Grab Deployment/ Retrieval	POCIS	Grab Deployment/ Retrieval
<b>Cocaine, benzoyllecgonine and sucralose</b>																
Cocaine	19±3.7	13±2.0/ 17±1.8	7.6±1.3	7.0±2.0/ 6±0.96	18±6.3	21±1.7/ 12±4.8	5.4±1.1	4.8±0.96/ 5.0±1.4	4.4±0.6 9	4.3±0.66/ 3.9±1.8	7.0±1.7	5.3±0.35/ 7.6±1.1	4.4±1.2	3.6±0.67/ 5.1±1.2	4.3±0.7 3	<LOD/ <LOD
Benzoyllecgonine	15±3.1	14±2.8/ 14±2.0	12±3.8	13±3.7/ 9±1.2	60±9.0	60±7.7/ 53±6.4	20±3.1	15±2.1/ 17±1.5	19±3.6	14±3.3/ 19±0.99	19±4.8	13±4.4/ 20±4.8	16±4.2	12±1.1/ 18±1.1	10±2.8	10.7±0.58/ 9.0±2.0
Sucralose	237±17	361±31/ 348±48	182±22	367±67/ 390±30	800±20	1603±63/ 2581±48	561±31	696±36/ 1100±23	260±60	456±56/ 484±84	310±10	355±55/ 459±59	169±16	373±33/ 234±24	86±8	478±47/ 331±36
<b>Amphetamine-type stimulants</b>																
Amphetamine	12±3.5	9.0±0.85/ 10±3.4	4.3±0.8 1	3.0±0.24/ 4.0±0.63	12±3.0	9.0±2.4/ 9.0±0.87	<LOQ	<LOD/ <LOD	<LOQ	<LOD/ <LOD	9.6±3.1	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD
Methamphetamine	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD
MDA	16±2.8	<LOD/ <LOD	10±2.6	<LOD/ <LOD	25±3.8	22±1.1/ 24±1.7	12±1.4	8.6±0.93/ 11±3.1	7.5±1.7	6.3±1.5/ 6.9±2.4	6.0±1.3	9.2±2.6/ 4.9±0.55	7.2±1.2	<LOD/ <LOD	6.7±1.1	<LOD/ <LOD
MDMA	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD
Ephedrine	24±2.1	21±1.7/ 2.0±2.9	20±1.6	17±1.1/ 19±0.61	207±7.62	<LOD/ <LOD	49±3.4	46±3.7/ 43±4.1	29±9.9	32±6.2/ 21±1.3	13±1.4	14±2.3/ 10±0.41	13±3.6	13±2.6/ 9.6±0.93	12±4.7	14±2.7/ 7.3±0.93
<b>Opioids</b>																
Codeine	31±4.1	3.0±0.34/ 28±3.2	23±2.5	22±2.5/ 20±2.4	327±17.9	300±1.3/ 318±16.9	<LOQ	<LOQ/ <LOQ	90±22	<LOQ/ <LOQ	52±2.1	<LOQ/ <LOQ	56±4.4	<LOQ/ <LOQ	44±3.5	<LOQ/<LO Q
Acetylcodeine	-	7.0±2.7/ 7.0±4.8	-	<LOQ/ <LOQ	-	25±2.7/30±4. 2	-	6.5±1.1/ 7.8±0.76	-	6.5±1.5/ 5.3±1.1	-	5.6±0.61/ 4.8±0.58	-	5.3±0.81/ 6.3±0.91	-	5.3±0.81/ 6.1±0.25
Dihydrocodeine	8.6±2.4	5.0±3.1/ 6.0±3.1	5.5±1.3	5.0±1.0/ 5.0±0.72	19±3.7	18±0.66/ 15±1.1	7.9±2.2	4.7±4.2/ 6.5±5.7	9.2±3.2	4.9±4.2/ 3.4±3.0	8.7±2.7	7.2±2.7/ 8.5±1.5	6.5±1.4	<LOD/ <LOD	5.7±1.5	<LOD/ <LOD
Morphine	6.3±2.4	4.0±1.7/ 7.0±0.55	4.0±1.4	3.0±2.8/ 3.0±2.9	36±6.2	31±1.4/ 35±5.7	3.5±1.0	2.5±2.2/ 2.8±2.6	4.6±2.8	3.7±3.4/ 3.0±5.2	6.8±1.1	<LOD/ <LOD	5.4±2.3	<LOD/ <LOD	6.4±4.1	<LOD/ <LOD
Acetylmorphine	-	12±3.5/ 13±0.57	-	9.0±1.5/ 7.0±1.1	-	74±4.6/ 83±2.7	-	8.6±1.5/ 8.2±0.98	-	9.4±0.82/ 7.3±1.1	-	8.6±1.1/ 8.3±1.3	-	8.1±0.49/ 6.2±0.97	-	5.7±0.50/ 7.7±0.52
Methadone	<LOQ	<LOQ/ <LOQ	<LOQ	<LOQ/ <LOQ	<LOQ	<LOQ/ <LOQ	<LOQ	<LOQ/ <LOQ	<LOQ	<LOQ/ <LOQ	<LOQ	<LOQ/ <LOQ	<LOQ	<LOQ/ <LOQ	<LOQ	<LOQ/ <LOQ
Heroin	-	<LOQ/ <LOQ	-	<LOD/ <LOD	-	<LOD/ <LOD	-	<LOD/ <LOD	-	<LOD/ <LOD	-	<LOD/ <LOD	-	<LOQ/ <LOQ	-	<LOQ/ <LOQ
Tramadol	6.7±2.2	6.0±2.1/ 5.0±2.9	2.9±1.8	1.0±1.9/ 3.0±3.0	18±5.0	18±2.4/ 4±0.85	8.3±1.1	7.1±2.5/ 6.6±1.2	5.1±1.0	3.3±2.8/ 4.2±3.6	3.3±2.6	5.1±0.06/ <LOD	4.6±3.2	<LOD/<LO D	5.4±1.4	<LOD/ <LOD
Ketamine	85±3.9	82±5.9/ 80±1.4	76±4.9	73±2.6/ 65±2.7	48±5.3	49±1.5/ 48±8.1	42±2.6	49±6.8/ 43±3.0	34±3.3	36±3.2/ 32±1.7	29±4.1	24±3.1/ 33±1.3	30±3.3	28±1.1/ 29±2.8	15±3.1	16±3.1/ 14±1.6
Oxycodone	11±1.8	10±2.6/ 10±1.3	7.4±1.5	6.0±5.1/ 5.0±4.5	22±2.7	16±5.5/ 17±4.7	6.8±0.9 8	4.1±3.6/ 7.6±0.50	4.9±0.9 1	4.9±0.28/ 3.6±3.3	14±2.4	12±0.86/ 11±2.9	5.1±0.7 7	3.4±2.9/ 3.4±2.9	5.1±0.7 5	<LOD/ <LOD
EDDP	<LOQ	<LOD/ <LOD	<LOD	<LOD/ <LOD	102±9.60	94±4.0/ 95±4.2	<LOQ	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD	<LOD	<LOD/ <LOD
Fentanyl	34±3.1	33±1.9/ 35±4.3	26±2.4	28±5.4/ 22±2.1	239±29. 0	227±13/ 260±25	30±3.5	32±3.6/ 26±3.2	26±4.3	28±3.6/ 23±2.7	18±1.2	17±0.88/ 18±1.5	16±1.2	14±0.69/ 14±0.80	12±1.7	12±0.80/ 11±2.33