

Supplementary Data 1

Detailed Analytical Parameters

1 Cut-off and internal standards concentrations

Table 1: Analyte and internal standards concentrations

Analyte	Cut-off (ng/mL)	Internal Standard	[IS] (ng/mL)
α -Hydroxyalprazolam	20	Triazolam-D ₄	100
Aripiprazole	10	Trazodone-D ₆	50
3-Hydroxy Bromazepam	20	Bromazepam-D ₄	450
Buprenorphine	5	Oxycodone-D ₃	100
Hydroxybupropion	20	Ephedrine-D ₃	100
N-Desmethylcitalopram	20	Citalopram-D ₆	40
N-Desmethylclobazam	20	Flunitrazepam-D ₇	20
Cocaethylene	20	Cocaine-D ₃	50
Norcodeine	20	Codeine-D ₃	100
N-Desmethylcyclobenzaprine	20	Amitriptyline-D ₃	40
Dextrorphan	20	Oxycodone-D ₃	100
Nordiazepam	20	Diazepam-D ₅	100
N-Desmethyl diphenhydramine	20	Diphenhydramine-D ₃	200
Duloxetine	20	Amitriptyline-D ₃	40
Norfentanyl	0.5	Fentanyl-D ₅	10
7-Aminoflunitrazepam	20	7-Aminoclonazepam-D ₄	100
N-Desmethylflunitrazepam	20	Desalkylflurazepam-D ₄	100
Norfluoxetine	20	Amphetamine-D ₈	100

Table 1: Analyte and internal standards concentrations

Analyte	Cut-off (ng/mL)	Internal Standard	[IS] (ng/mL)
2-Hydroxyethylflurazepam	20	Lorazepam-D ₄	300
Norketamine	20	Ketamine-D ₄	120
Lorazepam-glucuronide	40	Lorazepam-D ₄	300
mCPP	20	Amphetamine-D ₈	100
MDEA	20	MDMA-D ₅	7
MDPV metabolite	20	MDPV-D ₈	100
Normeperidine	40	Codeine-D ₃	100
α -Hydroxymidazolam	20	Diazepam-D ₅	100
N-desmethyilmirtazapine	20	Amitriptyline-D ₃	40
6-Acetylmorphine	5	Codeine-D ₃	100
Morphine-6 β -D-glucuronide	100	Morphine-D ₆	100
Naloxone	20	Oxymorphone-D ₃	100
Naltrexone	20	Oxycodone-D ₃	100
Desmethyloanzapine	20	Olanzapine-D ₈	20
Oxazepam-glucuronide	20	Oxazepam-D ₅	20
Phenylpropanolamine	30	Amphetamine-D ₈	100
Norpseudoephedrine	30	Amphetamine-D ₈	100
Norquetiapine	20	Quetiapine-D ₈	40
7-Hydroxyquetiapine	20	Quetiapine-D ₈	40
Temazepam-glucuronide	20	Diazepam-D ₅	100
α -Hydroxytriazolam	20	Triazolam-D ₄	100
N-Desmethylzopiclone	20	Zopiclone-D ₄	100

2 Liquid chromatography method

Mobile phase A: methanol : 10 *mM* Ammonium formate pH 3.0 (2:98 v:v)

Mobile phase B: acetonitrile

Rinsing solution: methanol : 1% formic acid in water : isopropanol (50:25:25 v:v:v)

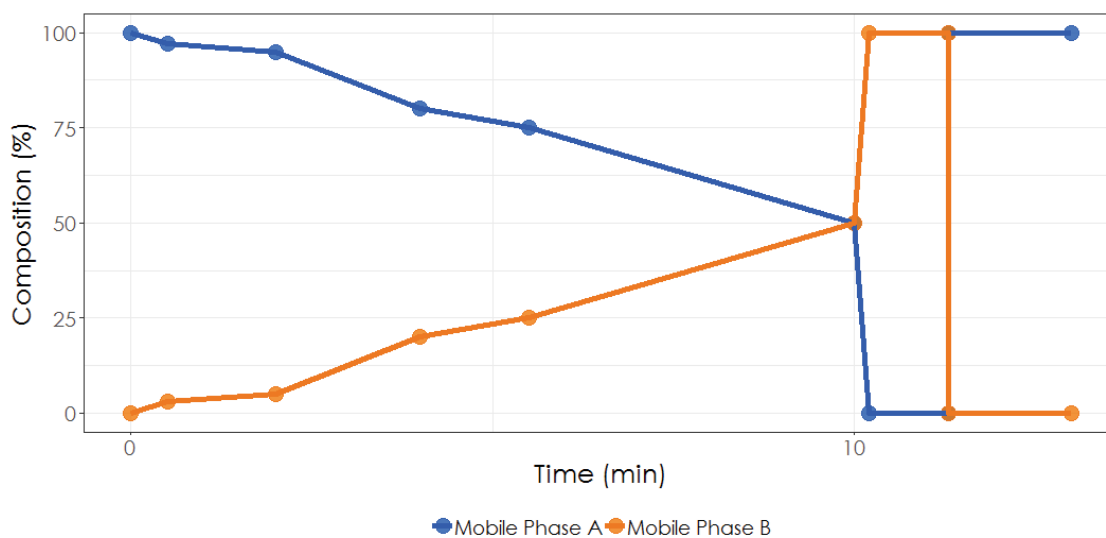
Analytical column: Zorbax Eclipse Plus C18, 2.1 × 100 *mm*, 3.5 μm (Agilent)

2.1 LC pump gradient

Flow rate: 650 $\mu\text{L}/\text{min}$

Table 2: LC Pump Gradient

Time (min)	A (%)	B (%)
0.00	100	0
0.50	97	3
2.00	95	5
4.00	80	20
5.50	75	25
10.00	50	50
10.20	0	100
11.30	0	100
11.31	100	0
13.00	100	0



2.2 Autosampler and thermostat settings

- Injection volume: 5 μL
- Wash time: 10 *sec*
- Autosampler temperature: 4 °C
- Column oven temperature: 50 °C

3 Mass spectrometry method

3.1 Divert valve settings

Table 3: Divert Valve Program

Time (min)	Position
0	MS
0.1	Waste
0.7	MS
10.5	Waste
12.5	MS

3.2 Voltages and other conditions

- Scan type: scheduled multiple reaction monitoring (MRM)
- Polarity: positive
- MRM detection window: 45 *sec*
- Ion source: Turbo Spray
- Curtain Gas (CUR): 30.0
- Collision Gas (CAD): 10
- Ion Spray Voltage (IS): 3000.0 *V*
- Source temperature: 700.0 °C

- Ion Source Gas 1 (GS1): 60.0
- Ion Source Gas (GS2): 65.0

Table 4: Monitored MRM transitions

Q1	Q3	Time	Analyte	DP	EP	CE	CXP
(Da)	(Da)	(min)		(V)	(V)	(V)	(V)
281.2	117.0	8.3	Amitriptyline-D ₃	76	10	32	11
144.1	127.0	3.4	Amphetamine-D ₈	40	10	13	10
320.0	186.2	6.9	Bromazepam-D ₄	100	10	45	18
331.2	234.0	7.2	Citalopram-D ₆	85	10	40	15
290.1	254.0	4.8	7-Aminoclonazepam-D ₄	80	10	30	18
308.2	185.0	5.3	Cocaine-D ₃	30	10	21	15
303.3	215.0	3.5	Codeine-D ₃	110	10	36	18
290.1	89.0	9.8	Diazepam-D ₅	45	10	70	15
259.2	115.0	7.0	Diphenhydramine-D ₃	55	10	80	10
169.1	136.0	2.9	Ephedrine-D ₃	40	10	29	12
342.2	188.2	6.8	Fentanyl-D ₅	110	10	34	17
321.1	275.1	8.7	Flunitrazepam-D ₇	100	10	36	12
293.1	140.0	8.8	Desalkylflurazepam-D ₄	110	10	40	15
244.1	131.0	4.6	Ketamine-D ₄	64	10	43	12
327.1	281.0	8.3	Lorazepam-D ₄	70	10	33	15
199.1	165.1	4.0	MDMA-D ₅	60	10	20	15
285.2	175.1	5.3	MDPV-D ₈	75	10	31	15
292.1	152.1	1.7	Morphine-D ₆	100	10	79	14
321.1	261.1	4.0	Olanzapine-D ₈	40	10	26	25
292.1	246.1	8.1	Oxazepam-D ₅	60	10	30	14
319.2	259.0	3.8	Oxycodone-D ₃	95	10	35	15
305.2	287.0	1.9	Oxymorphone-D ₃	90	10	22	16
392.2	254.0	7.0	Quetiapine-D ₈	70	10	55	15

Table 4: Monitored MRM transitions

Q1	Q3	Time	Analyte	DP	EP	CE	CXP
(Da)	(Da)	(min)		(V)	(V)	(V)	(V)
379.2	182.1	6.2	Trazodone-D ₆	90	10	35	14
347.1	208.0	8.7	Triazolam-D ₄	100	10	70	18
393.1	245.0	4.9	Zopiclone-D ₄	60	10	26	10
325.1	297.2	8.0	α -Hydroxyalprazolam 1	110	10	38	11
325.1	216.1	8.0	α -Hydroxyalprazolam 2	110	10	56	18
448.1	285.1	8.3	Aripiprazole 1	80	10	37	10
448.1	176.1	8.3	Aripiprazole 2	80	10	42	11
332	287.0	6.0	3-Hydroxy Bromazepam 1	60	10	30	15
332.0	303.1	6.0	3-Hydroxy Bromazepam 2	60	10	30	15
468.3	396.2	7.6	Buprenorphine 1	20	10	55	10
468.3	414.3	7.6	Buprenorphine 2	20	10	50	10
256.1	130.1	5.0	Hydroxybupropion 1	50	10	48	12
256.1	103.1	5.0	Hydroxybupropion 2	50	10	49	18
312.2	110.1	7.1	N-Desmethyleitalopram 1	70	10	30	15
312.2	263.1	7.1	N-Desmethyleitalopram 2	70	10	24	25
287.1	245.0	8.3	N-Desmethylelobazam 1	100	10	28	15
287.1	210.0	8.3	N-Desmethylelobazam 2	100	10	42	13
319.2	197.1	6.1	Cocaethylene 1	100	10	20	15
318.2	150.0	6.1	Cocaethylene 2	100	10	28	15
286.1	115.0	3.3	Norcodeine 1	100	10	90	15
286.1	128.0	3.3	Norcodeine 2	100	10	80	15
263.2	216.0	8.0	N-Desmethyleclobenzaprine 1	60	10	51	17
263.2	232.0	8.0	N-Desmethyleclobenzaprine 2	60	10	22	21
259.2	158.1	4.8	Dextrorphan 1	85	10	53	17
258.2	115.0	4.8	Dextrorphan 2	85	10	83	15
271.1	140.0	8.9	Nordiazepam 1	95	10	42	13

Table 4: Monitored MRM transitions

Q1	Q3	Time	Analyte	DP	EP	CE	CXP
(Da)	(Da)	(min)		(V)	(V)	(V)	(V)
271.1	165.1	8.9	Nordiazepam 2	95	10	39	15
243.1	168.1	6.9	N-Desmethyl diphenhydramine 1	40	10	20	15
243.1	153.1	6.9	N-Desmethyl diphenhydramine 2	40	10	50	15
298.1	154.0	8.2	Duloxetine 1	60	10	9	9
298.1	44.0	8.2	Duloxetine 2	60	10	50	10
233.2	84.1	4.6	Norfentanyl 1	60	10	26	10
233.2	150.1	4.6	Norfentanyl 2	60	10	25	13
284.1	240.0	5.5	7-Aminoflunitrazepam 1	120	10	51	20
284.1	226.1	5.5	7-Aminoflunitrazepam 2	120	10	40	20
300.1	254.0	7.9	N-Desmethyflunitrazepam 1	85	10	36	15
300.1	198.1	7.9	N-Desmethyflunitrazepam 2	85	10	55	15
296.1	134.2	8.5	Norfluoxetine 1	65	10	10	10
296.1	296.1	8.5	Norfluoxetine 2	65	10	5	10
333.1	211.1	8.5	2-Hydroxyethylflurazepam 1	120	10	51	15
333.1	109.1	8.5	2-Hydroxyethylflurazepam 2	120	10	40	14
224.1	179.3	4.5	Norketamine 1	70	10	20	15
225.1	126.0	4.5	Norketamine 2	70	10	35	20
497.1	321.0	7.0	Lorazepam-glucuronide 1	70	10	20	24
497.1	275.1	7.0	Lorazepam-glucuronide 2	70	10	57	16
197.1	154.1	4.9	mCPP 1	75	10	20	13
197.1	118.0	4.9	mCPP 2	75	10	29	14
209.1	164.0	4.4	MDEA 1	60	10	14	15
209.1	136.1	4.4	MDEA 2	60	10	30	15
279.2	176.1	4.6	MDPV metabolite 1	50	10	23	20
279.2	127.2	4.6	MDPV metabolite 2	50	10	23	15
235.1	161.1	5.5	Normeperidine 1	60	10	22	15

Table 4: Monitored MRM transitions

Q1 (Da)	Q3 (Da)	Time (min)	Analyte	DP (V)	EP (V)	CE (V)	CXP (V)
234.1	115.1	5.5	Normeperidine 2	60	10	85	11
253.2	196.2	5.0	N-desmethylnortazapine 1	70	10	31	15
252.2	209.2	5.0	N-desmethylnortazapine 2	70	10	22	20
342.1	168.1	7.3	α -Hydroxymidazolam 1	110	10	55	15
342.1	140.0	7.3	α -Hydroxymidazolam 2	110	10	84	12
328.2	165.0	4.0	6-Acetylmorphine 1	80	10	55	10
328.2	211.0	4.0	6-Acetylmorphine 2	80	10	37	10
462.1	286.1	1.6	Morphine-6 β -D-glucuronide 1	50	10	44	14
462.1	165.0	1.6	Morphine-6 β -D-glucuronide 2	50	10	71	15
328.2	212.2	3.4	Naloxone 1	100	10	55	15
328.2	253.2	3.4	Naloxone 2	100	10	38	15
342.2	270.1	3.9	Naltrexone 1	100	10	38	15
342.2	212.0	3.9	Naltrexone 2	100	10	60	20
299.1	213.1	3.9	Desmethylnortazapine 1	140	10	30	11
299.1	198.1	3.9	Desmethylnortazapine 2	140	10	42	12
463.1	241.1	6.5	Oxazepam-glucuronide 1	80	10	55	20
463.1	287.1	6.5	Oxazepam-glucuronide 2	80	10	25	20
152.1	117.1	2.3	Phenylpropanolamine 1	40	10	23	12
152.1	91.0	2.3	Phenylpropanolamine 2	40	10	47	16
152.1	134.1	2.5	Norpseudoephedrine 1	35	10	14	10
152.1	117.0	2.5	Norpseudoephedrine 2	35	10	23	10
297.1	140.1	6.9	Norquetiapine 1	70	10	80	15
297.1	184.0	6.9	Norquetiapine 2	70	10	53	15
401.1	270.0	4.7	7-Hydroxyquetiapine 1	30	10	35	18
401.1	209.1	4.7	7-Hydroxyquetiapine 2	30	10	60	20
477.1	301.1	7.2	Temazepam-glucuronide 1	85	10	21	9

Table 4: Monitored MRM transitions

Q1	Q3	Time	Analyte	DP	EP	CE	CXP
(Da)	(Da)	(min)		(V)	(V)	(V)	(V)
477.1	255.1	7.2	Temazepam-glucuronide 2	85	10	60	9
359	331.0	8.0	α -Hydroxytriazolam 1	100	10	40	10
359.0	176.0	8.0	α -Hydroxytriazolam 2	100	10	38	16
375.1	245.1	4.9	N-Desmethylzopiclone 1	70	10	25	10
375.1	217.0	4.9	N-Desmethylzopiclone 2	70	10	50	10

The method is validated on the following systems: HPLC Agilent 1200 series and 1260 Infinity, LC-MS/MS 5500 QTRAP Sciex.

The data acquisition software used is Analyst® 1.6.2 build 8489 and the data analysis software used is Multiquant® 3.0.1 (Version 3.0.6256.0)