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EXPERTOV SR**

Annex to the Report for 2024

(Tabular and Graphical Section)

Monitoring of Psychoactive Compounds in Wastewater in Slovakia for 2024

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AČE SR

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Table of Contents

Table 1 Selected Chemical Compounds Monitored in Wastewater in Several Slovak Cities	4
Table 2 Sampling Locations, Sampling Times, and the Population Covered by Individual Wastewater Treatment Plants	6
Table 3 Quantities of Selected Illicit Drugs in Wastewater from 8 Slovak Cities (8 Treatment Plants) Normalized per 1000 Inhabitants with the Date of Analysis	9
Table 4 Concentrations of Selected Psychoactive Substances (Methadone and Its Main Metabolite EDDP) in Wastewater from 8 Slovak Cities Normalized per 1000 Inhabitants with the Date of Analysis	12
Table 5 Monitoring the Occurrence of New Psychoactive Substances (NPS) Based on Wastewater Analyses in Various Slovak Cities in 2024, Including During Festivals	15
Summary of Monitoring Results for Individual Drugs and Their Metabolites Obtained from Wastewater Analysis for the Period 2013–2024 (Including During the Lockdown, March–May 2020)	17
Report Appendices (Articles and Publications Presented at Conferences and Published in International Journals – 2023–2025)	25
Summary Maps of Drug Occurrence in Wastewater in Slovakia	28



Table 1. Selected Chemical Compounds Monitored in Wastewater in Several Slovak Cities

Number	Compound
1	Katinón
2	Oxykodon
3	MDA
4	Metamfetamín
5	Ketamín
6	Norketamín
7	2-oxy-3-hydroxy-LSD
8	LSD
9	Amfetamín
10	Kokaín
11	Benzoylekgonín
12	MDMA
13	THC-COOH
14	Buprenorfin
15	Metoxyamfetamín
16	25iP – NBOMe
17	Efenidín
18	Metadón
19	MDEA
20	MBDB
21	Metylfenidát
22	Risperidon
23	Midazolam
24	EDDP
25	Heroín
26	Nikotín
27	Kotinín

28	Kofeín
29	MDPV
30	metoxetamín
31	25I-NBOMe
32	dextrometórfan
33	fentanyl
34	DOM
35	mCPP
36	etylfenidát
37	4,4- DMAR
38	PMMA
39	N,N-Dimetylkatinón
40	Etkatinón
41	4-FMC
42	3,4-DMMC
43	4-MEC
44	Bufedrón
45	Pentedrón
46	Metylón
47	Etylón
48	Butylón
49	Pentylón
50	1-Nafyrón
51	Nafyrón
52	2-FDCK
53	4-OH-DMT
54	4,4-DMAR
55	5-MeO-MiPT
56	5-MeO-DMT
57	4-AcO-DMT

Table 2. Sampling Locations, Sampling Times, and the Analyzed Population Covered by Individual Wastewater Treatment Plants

Sample Number	Wastewater Treatment Plant	Population	Sampling Date	Festival
1	BRATISLAVA	450.000	08.04.2024	
2			09.04.2024	
3			10.04.2024	
4			11.04.2024	
5			12.04.2024	
6			13.04.2024	
7			14.04.2024	
8			15.04.2024	
9			10.8.2024	
10			11.8.2024	
11			12.8.2024	
12			13.8.2024	
13			14.8.2024	
14			15.8.2024	
15			16.8.2024	
16	470.000	470.000	17.8.2024	LOVESTREAM
17			18.8.2024	LOVESTREAM
18			19.8.2024	LOVESTREAM
19			20.8.2024	
20			21.8.2024	
21			29.8.2024	
22			30.8.2024	
23	470.000	470.000	31.8.2024	Uprising
24			1.9.2025	Uprising
25			2.9.2025	
26			3.9.2025	
27	TRNAVA	89.600	2.5.2024	
28			6.5.2024	
29			5.6.2024	

Sample Number	Wastewater Treatment Plant	Population	Sampling Date	Festival	
30	PIEŠŤANY	30.000	08.04.2024		
31			09.04.2024		
32			10.04.2024		
33			11.04.2024		
34			12.04.2024		
35			13.04.2024		
36			14.04.2024		
37	TRENČÍN	47.000	12.2.2024		
38			3.3.2024		
39			5.5.2024		
40			16.6.2024		
41			9.7.2024		
42			10.7.2024		
43			63.000	11.7.2024	Pohoda 2024
44			63.000	12.7.2024	Pohoda 2024
45			63.000	13.7.2024	Pohoda 2024
46				8.8.2024	
47	63.000	9.8.2024	Grape Festival		
48	63.000	10.8.2024	Grape Festival		
49	63.000	11.8.2024	Grape Festival		
50	ŽILINA	105.000	4.3.2024		
51			5.5.2024		
52			8.8.2024		
53	PREŠOV	99.586	4.4.2024		
54			24.5.2024		
55			26.8.2024		

Sample Number	Wastewater Treatment Plant	Population	Sampling Date	Festival
56	KOŠICE	215.363	2.2.2024	
57			5.6.2024	
58			11.9.2024	
59	NOVÉ MESTO NAD VÁHOM	22.000	20.8.2024	
60			21.8.2024	
61			22.8.2024	
62			23.8.2024	
63		32.000	24.8.2024	Country Lodenica
64		32.000	25.8.2024	Country Lodenica
65		32.000	26.8.2024	Country Lodenica
		Over 1.05 million inhabitants		

Table 3. Amounts of Selected Illicit Drugs in Wastewater from 8 Monitored Slovak Cities (8 Treatment Plants) Normalized per 1000 Inhabitants with the Sampling Date

WWTP	Date of Analysis	Amphetamine		Methamphetamine		BE (Benzoylcegonine)		Cocaine		MDMA		THC-COOH	
		ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000
BRATISLAVA	08.04.2024	59	15	1333	328	1300	887	477	117	85	20,9	247	61
	09.04.2024	31	7	1033	248	997	663	503	121	47	11,3	233	56
	10.04.2024	45	11	1133	267	1133	741	520	123	46	10,9	240	57
	11.04.2024	65	15	1300	301	1133	727	540	125	39	9,0	266	62
	12.04.2024	67	16	1333	316	1200	787	627	149	55	13,0	273	65
	13.04.2024	55	12	1300	280	1800	1073	837	180	137	29,5	247	53
	14.04.2024	52	12	1467	330	2033	1265	830	186	143	32,1	250	56
	15.04.2024	38	25	817	544	820	1513	337	225	52	34,6	240	160
	10.8.2024	88	16	1150	208	680	341	260	47	44	8,0	180	33
	11.8.2024	110	21	1350	253	720	374	280	52	55	10,3	200	37
	12.8.2024	90	19	1250	257	660	376	240	49	52	10,7	170	35
	13.8.2024	110	25	1450	333	780	496	320	73	38	8,7	210	48
	14.8.2024	100	22	1320	286	720	432	270	58	42	9,1	165	36
	15.8.2024	150	38	1600	401	1100	764	350	88	47	11,8	360	90
	16.8.2024	140	27	1600	309	1200	643	380	73	47	9,1	320	62
	LOVESTREAM	17.8.2024	210	53	1700	432	1700	1196	640	163	150	38,1	260
LOVESTREAM	18.8.2024	160	40	1300	326	1400	973	410	103	170	42,6	200	50
LOVESTREAM	19.8.2024	170	34	1900	379	1700	939	440	88	220	43,9	440	88
	20.8.2024	120	37	980	302	590	503	250	77	50	15,4	290	89
	21.8.2024	220	46	1500	314	1100	638	330	69	49	10,3	300	63
	29.8.2024	180	45	1200	301	890	619	470	118	64	16,1	340	85
	30.8.2024	160	29	660	121	500	253	260	48	28	5,1	220	40
Uprising – festival	31.8.2024	190	31	1600	261	1600	722	600	98	300	48,9	310	51
Uprising – festival	1.9.2024	200	33	1300	217	1400	648	550	92	370	61,8	350	58
	2.9.2024	210	37	1300	231	1000	491	420	74	230	40,8	420	74
	3.9.2024	160	29	1100	197	620	307	340	61	68	12,2	260	47

WWTP	Date of Analysis	Amphetamine		Methamphetamine		BE (Benzoylcegonine)		Cocaine		MDMA		THC-COOH	
		ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000
Average (Excluding Festival Periods)	-	107	24	1246	292	999	662	421	101	68	16	259	62
Average festival LOVESTREAM	-	180	42	1633	379	1600	1036	497	118	180	42	300	68
Average festival Uprising	-	195	32	1450	239	1500	685	575	95	335	55	330	55
TRNAVA	2.5.2024	66	17	750	188	140	97,4	61	15,3	12	3,0	120	30
	6.5.2024	120	32	920	245	200	147,5	77	20,5	35	9,3	140	37
	5.6.2024	220	53	1540	372	280	187,3	89	21,5	18	4,3	100	24
Average		135	34	1070	268	207	144	76	19	22	6	120	30
PIEŠŤANY	08.04.2024	36,5	14	833	311	243	251	117	44	45	16,8	157	59
	09.04.2024	25	9	813	299	190	194	98	36	67	24,6	177	65
	10.04.2024	23	8	637	228	130	129	58	21	23	8,2	197	70
	11.04.2024	14	5	513	184	153	152	54	19	12	4,3	167	60
	12.04.2024	29	10	877	311	157	154	49	17	9	3,2	153	54
	13.04.2024	18	6	527	188	167	165	59	21	11	3,9	167	60
	14.04.2024	27	9	887	307	333	319	130	45	26	9,0	173	60
Average		25	9	727	264	196	195	81	29	28	10	170	61
TRENČÍN	12.2.2024	44	14,0	410	131	34	30,0	14	4,5	34	10,8	66	21
	3.3.2024	54	17,4	550	177	38	33,9	18	5,8	32	10,3	88	28
	5.5.2024	56	18,4	620	204	42	38,2	20	6,6	48	15,8	100	33
	16.6.2024	52	16,5	580	184	50	44,1	18	5,7	54	17,2	98	31
	9.7.2024	280	92,9	1600	531	320	294,0	75	24,9	54	17,9	370	123
	10.7.2024	220	71,7	1300	423	370	333,9	90	29,3	37	12,1	200	65
Pohoda 2024	11.7.2024	150	43,7	1200	350	1200	968,7	340	99,1	160	46,6	160	47
Pohoda 2024	12.7.2024	290	121,6	1400	587	4300	4993,2	1500	628,8	1300	545,0	210	88
Pohoda 2024	13.7.2024	160	65,5	1300	533	2300	2610,1	450	184,4	430	176,2	350	143

WWTP	Date of Analysis	Amphetamine		Methamphetamine		BE (Benzoylcegonine)		Cocaine		MDMA		THC-COOH	
		ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000
	8.8.2024	320	158,1	1500	741	280	383,2	120	59,3	44	21,7	370	183
Grape festival	9.8.2024	520	127,4	1800	441	4400	2987,0	2000	490,2	2700	661,7	370	91
Grape festival	10.8.2024	460	111,1	1700	410	14000	9362,6	2300	555,3	14000	3380,0	380	92
Grape festival	11.8.2024	310	73,6	1700	404	5100	3354,6	930	220,8	5300	1258,5	460	109
Average (Excluding Festival Periods)	-	147	56	937	342	162	165	51	19	43	15	185	69
Average festival Pohoda	-	200	77	1300	490	2600	2857	763	304	630	256	240	93
Average festival Grape	-	430	104	1733	418	7833	5235	1743	422	7333	1767	403	97
ŽILINA	4.3.2024	31	13	510	216	108	126,9	33	14,0	16	6,8	32	14
	5.5.2024	22	10	340	157	68	87,1	24	11,1	28	12,9	35	16
	8.8.2024	40	19	450	218	88	118,1	28	13,6	20	9,7	42	20
Average		31	14	433	197	88	111	28	13	21	10	36	17
PREŠOV	4.4.2024	22	5	230	51	12	7	4	1	11	2,4	40	9
	24.5.2024	34	7	460	97	16	9	4,2	1	22	4,7	52	11
	26.8.2024	48	12	660	163	16	11	4	1	20	4,9	76	19
Average		35	8	450	104	15	9	4	1	18	4	56	13
KOŠICE	2.2.2024	44	12	860	235	46	35	10	3	16	4,4	24	7
	5.6.2024	28	8	520	151	29	23	4	1	8	2,3	36	10
	11.9.2024	56	17	940	290	49	42	14	4	22	6,8	44	14
Average		43	12	773	225	41	33	9	3	15	5	35	10
Nové Mesto nad Váhom	20.8.2024	22	3,6	200	33	88	40,2	32,0	5,3	18,0	3,0	66	11
	21.8.2024	35	5,0	240	34	100	39,4	34,0	4,8	22,0	3,1	56	8
	22.8.2024	28	4,0	210	30	120	47,7	38,0	5,5	28,0	4,0	72	10

WWTP	Date of Analysis	Amphetamine		Methamphetamine		BE (Benzoylecgonine)		Cocaine		MDMA		THC-COOH	
		ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000	ng/L	mg/day/1000
	23.8.2024	40	5,5	250	34	95	36,1	34,0	4,7	42,0	5,8	120	16
Country Lodenica	24.8.2024	410	37,7	1300	119	640	162,9	230,0	21,1	31,0	2,8	410	38
Country Lodenica	25.8.2024	290	30,3	1500	157	670	193,7	170,0	17,7	81,0	8,5	410	43
Country Lodenica	26.8.2024	350	38,8	1200	133	440,0	135,2	93,0	10,3	56,0	6,2	330	37
Average (Excluding Festival Periods)		31	5	225	33	101	41	35	5	28	4	79	11
Average festival Lodenica		350	36	1333	136	583	164	164	16	56	6	383	39

Note: ND – Not Detected Value,

Table 4. Concentrations of Selected Psychoactive Substances (Methadone and Its Main Metabolite EDDP) in Wastewater from 8 Slovak Cities Normalized per 1000 Inhabitants with the Sampling Date

WWTP	Sampling Date	Metadon		EDDP	
		ng/L	mg/day/1000	ng/L	mg/day/1000
BRATISLAVA	08.04.2024	15	4	33	8
	09.04.2024	12	3	25	6
	10.04.2024	14	3	30	7
	11.04.2024	17	4	41	9
	12.04.2024	15	4	36	9
	13.04.2024	13	3	30	6
	14.04.2024	13	3	32	7
	15.04.2024	11	7	24	16
	11.8.2024	-	-	-	-
	12.8.2024	-	-	-	-
	13.8.2024	-	-	-	-
	14.8.2024	-	-	-	-
	15.8.2024	-	-	-	-
	16.8.2024	-	-	-	-
	17.8.2024	-	-	-	-
18.8.2024	-	-	-	-	
19.8.2024	-	-	-	-	
20.8.2024	-	-	-	-	
21.8.2024	-	-	-	-	
29.8.2024	-	-	-	-	
30.8.2024	-	-	-	-	
31.8.2024	-	-	-	-	
1.9.2025	-	-	-	-	
2.9.2025	-	-	-	-	
3.9.2025	-	-	-	-	
Average		14	4	31	9
TRNAVA	2.5.2024	1	0	3	1

WWTP	Sampling Date	Metadon		EDDP	
		ng/L	mg/day/1000	ng/L	mg/day/1000
	6.5.2024	2	1	7	2
	5.6.2024	1	0	5	1
Average		1	0	5	1
PIEŠŤANY	08.04.2024	0	0	0	0
	09.04.2024	0	0	0	0
	10.04.2024	0	0	0	0
	11.04.2024	0	0	0	0
	12.04.2024	0	0	0	0
	13.04.2024	0	0	0	0
	14.04.2024	0	0	0	0
Average		0	0	0	0
TRENČÍN	12.2.2024	3	1,0	5	1,6
	3.3.2024	4	1,3	4	1,3
	5.5.2024	4	1,3	6	2,0
	16.6.2024	6	1,9	5	1,6
	9.7.2024	2	0,7	4	1,3
	10.7.2024	2	0,7	2	0,7
	11.7.2024	1	0,4	2	0,8
	12.7.2024	1	0,6	2	1,1
	13.7.2024	0	0,0	1	0,5
	8.8.2024	1	0,5	2	1,0
	9.8.2024	2	0,7	2	0,7
	10.8.2024	1	0,3	2	0,6
	11.8.2024	1	0,3	1	0,3
Average		2	1	3	1
ŽILINA	4.3.2024	2,4	1	2	1
	5.5.2024	3,6	2	3	1

WWTP	Sampling Date	Metadon		EDDP	
		ng/L	mg/day/1000	ng/L	mg/day/1000
	8.8.2024	8	4	2	1
Average		5	2	2	1
PREŠOV	4.4.2024	6	1,3	4	0,9
	24.5.2024	7	1,5	4	0,8
	26.8.2024	11	2,7	3	0,7
Average		8	2	4	1
KOŠICE	2.2.2024	9	2,5	14	3,8
	5.6.2024	8	2,3	10	2,9
	11.9.2024	11	3,4	11	3,4
Average		9	3	12	3
<i>Nové Mesto nad Váhom</i>	20.8.2024	0	0	0	0
	21.8.2024	0	0	0	0
	22.8.2024	0	0	0	0
	23.8.2024	0	0	0	0
	24.8.2024	0	0	0	0
	25.8.2024	0	0	0	0
	26.8.2024	0	0	0	0
Average		0	0	0	0

Note: ND – Not Detected Value

Monitoring the Occurrence of New Psychoactive Substances (NPS) Based on Wastewater Analyses in Various Slovak Cities in 2024

Table 5. Summary of New Psychoactive Compounds Not Detected in Wastewater from the Monitored Slovak Cities in 2024

25iP – NBOMe
Efenidín
Metadón
MDEA
MBDB
Metylfenidát
Risperidon
Midazolam
EDDP
Heroín
Nikotín
Kotinín
Kofeín
MDPV
metoxetamín
25I-NBOMe
dextrometórfan
fentanyl
DOM
mCPP
etylfenidát
4,4- DMAR

PMMA
N,N-Dimetylkatinón
Etkatinón
4-FMC
3,4-DMMC
4-MEC
Bufedrón
Pentedrón
Metylón
Etylón
Butylón
Pentylón
1-Nafyrón
Nafyrón
2-FDCK
4-OH-DMT
4,4-DMAR
5-MeO-MiPT
5-MeO-DMT
4-AcO-DMT

Summary of Monitoring Results for Individual Drugs and Their Metabolites Obtained from Wastewater Analysis for the Period 2013–2024 (Including During the Lockdown, March–May 2020)

Table 6a. Summary Table Compiled from Multiple Reports (2013–2024) Describing the Average Amounts of the Drug Methamphetamine in Wastewater from Various Slovak Cities, Including During Festivals and the 2020 Lockdown, Normalized per 1000 Inhabitants

Methamphetamine mg/deň/1000	Average 2013	Average 2014	Average 2015	Average 2016	Average 2018	Average 2019	Average 2020	Average 2020 LD	Average 2021	Average 2022	Average 2024
PETRŽALKA	183	152	363	207	145	102	141	133	379	199	/
Petržalka (Grape - festival)	/	/	/	/	/	/	/	/	1112	/	/
KOŠICE	49	68	118	57	132	104	127	88	137	137	225
BRATISLAVA	133	115	166	495	106	181	231	197	251	162	292
Bratislava (Bažant na mlynoch – festival)	/	/	959	/	/	/	/	/	/	/	/
Bratislava (Hip hop žije – festival)	/	/	/	/	/	315	/	/	257	/	/
Bratislava (Uprising – festival)	/	/	/	/	/	/	/	/	217	159	239
Bratislava (LOVESTREAM – festival)	/	/	/	/	/	/	/	/	/	/	379
PIEŠŤANY	152	119	242	268	148	225	498	373	213	103	264
Piešťany (Grape - festival)	/	120	72	/	218	232	/	/	/	/	/
Piešťany (Lodenica - festival)	/	/	75	/	249	147	/	/	/	/	/
NITRA	/	123	249	67	232	221	166	91	285	49	/
KOMÁRNO	/	/	/	123	166	338	320	/	/	/	/
DUNAJSKÁ STREDA	/	479	1088	510	345	547	240	/	657	741	/
SEREĎ	/	211	673	361	183	827	250	/	255	320	/
NOVÉ MESTO NAD VÁHOM	/	/	/	/	/	22	/	/	108	/	33
Nové mesto nad váhom/Piešťany (Topfest – festival)	/	129	257	/	/	22	/	/	138	/	/

Nové mesto nad váhom/Piešťany (Lodenica – festival)	/	/	/	/	/	/	/	/	/	/	136
ŽILINA	/	/	168	101	256	154	221	255	318	214	197
BANSKÁ BYSTRICA	88	60	124	92	41	153	233	304	146	142	/
PREŠOV	16	12	22	29	26	41	73	82	52	18	104
POPRAD	/	10	25	/	/	30	250	178	/	56	/
TRENČÍN (LB)	48	20	174	/	122	115	54	54	230	121	342
Trenčín (Pohoda – festival)	/	32	113	/	116	41	/	/	177	/	490
Trenčín (Grape – festival)	/	/	/	/	/	/	/	/	/	/	418
DNV	116	/	194	82	/	/	58	58	/	/	/
TRENČÍN (PB)	10	/	525	/	//	/	/	/	/	/	/
TRNAVA	/	354	1234	440	159	/	282	104	289	80	268
Bratislava Gypsy	/	121	/	/	/	/	/	/	/	/	/
ZVOLEN	100	66	/	/	/	/	/	/	/	/	/
SKALICA	44	45	/	/	/	/	/	/	/	/	/
Skalica – Skalické dni	/	49	/	/	/	/	/	/	/	/	/
PRIEVIDZA	/	322	/	/	/	/	/	/	/	/	/
ČADCA	/	227	/	/	/	/	108	/	/	/	/
MARTIN	/	70	/	/	/	/	/	/	/	/	/
HOLÍČ	19	/	/	/	/	/	/	/	/	/	/
LIPTOVSKÝ MIKULÁŠ	/	/	/	/	/	/	/	/	150	/	/

LD – lockdown March–May 2020, year 2023 – monitoring not conducted

Table 6b. Summary Table Compiled from Multiple Reports (2013–2024) Describing Cocaine Consumption via the Metabolite BE in Wastewater from Various Slovak Cities, Including During Festivals and the 2020 Lockdown, Normalized per 1000 Inhabitants

BE (Benzoylcegonine) mg/day/1000	Average 2013	Average 2014	Average 2015	Average 2016	Average 2018	Average 2019	Average 2020	Average 2020 LD	Average 2021	Average 2022	Average 2024
PETRŽALKA	29	77	137	156	232	135	151	114	302	73	/
Petržalka (Grape - festival)	/	/	/	/	/	/	/	/	337	/	/
KOŠICE	3	13	10	18	20	25	22	15	24	23	33
BRATISLAVA	35	95	65	183	234	279	351	353	277	602	662
Bratislava (Bažant na mlynoch – festival)	/	/	1024	/	/	/	/	/	/	/	/
Bratislava (Hip hop žije – festival)	/	/	/	/	/	779	/	/	386	/	/
Bratislava (Uprising – festival)	/	/	/	/	/	/	/	/	411	713	685
Bratislava (LOVESTREAM – festival)	/	/	/	/	/	/	/	/	/	/	1036
PIEŠŤANY	6	10	19	53	126	81	100	36	35	112	195
Piešťany (Grape - festival)	/	76	69	/	891	3793	/	/	/	/	/
Piešťany (Lodenica - festival)	/	/	31	/	136	44	/	/	/	/	/
NITRA	/	18	29	35	128	191	249	82	167	117	/
KOMÁRNO	/	/	/	5	48	132	135	/	/	/	/
DUNAJSKÁ STREDA	/	58	94	48	34	99		/	152	60	/
SEREĎ	/	11	45	69	78	200	264	/	219	92	/
NOVÉ MESTO NAD VÁHOM	/	/	/	/	/	17	/	/	111	/	41
Nové mesto nad váhom/Piešťany (Topfest – festival)	/	23	30	/	/	33	/	/	129	/	/
Nové mesto nad váhom/Piešťany (Lodenica – festival)	/	/	/	/	/	/	/	/	/	/	164
ŽILINA	//		26	7	93	77	122	119	76	29	111
BANSKÁ BYSTRICA	3	8	24	14	5	26	35	43	38	45	/
PREŠOV	1	3	6	10	9	10	8	3	6	11	9

POPRAD	/	9	17	/	/	10	16	18	/	22	/
TRENČÍN (LB)	3	4	19	/	44	80	15	9	44	51	165
Trenčín (Pohoda – festival)	/	13	12	/	515	256	/	/	63	/	2857
Trenčín (Grape – festival)	/	/	/	/	/	/	/	/	/	/	5235
DNV	16	/	41	20	/	/	52	52	/	/	/
TRENČÍN (PB)	/	/	/	/	/	/	/	/	/	/	/
TRNAVA	/	37	224	223	48	/	180	65	86	123	144
Bratislava Gypsy	/	83	/	/	/	/	/	/	/	/	/
ZVOLEN	2	9	/	/	/	/	/	/	/	/	/
SKALICA	10	4	/	/	/	/	/	/	/	/	/
Skalica – Skalické dni	/	6	/	/	/	/	/	/	/	/	/
PRIEVIDZA	/	4	/	/	/	/	/	/	/	/	/
ČADCA	/	9	/	/	/	/	18,5	/	/	/	/
MARTIN	/	6	/	/	/	/	/	/	/	/	/
HOLÍČ	1	/	/	/	/	/	/	/	/	/	/
LIPTOVSKÝ MIKULÁŠ	/	/	/	/	/	/	/	/	27	/	/

LD – lockdown March–May 2020, year 2023 – monitoring not conducted

Table 6c. Summary Table Compiled from Multiple Reports (2013–2024) Describing the Occurrence of the Drug MDMA in Wastewater from Various Slovak Cities, Including During Festivals and the 2020 Lockdown, Normalized per 1000 Inhabitants

MDMA mg/day/1000	Average 2013	Average 2014	Average 2015	Average 2016	Average 2018	Average 2019	Average 2020	Average 2020 LD	Average 2021	Average 2022	Average 2024
PETRŽALKA	8	7	15	22	7	4	7	5	6	1	/
Petržalka (Grape - festival)	/	/	/	/	/	/	/	/	5	/	/
KOŠICE	2	5	4	8	6	9	4	3	3	2	5
BRATISLAVA	5	3	7	20	13	13	15	16	9	11	16
Bratislava (Bažant na mlynoch – festival)	/	/	111	/	/	/	/	/	/	/	/
Bratislava (Hip hop žije – festival)	/	/	/	/	/	95	/	/	9	/	/
Bratislava (Uprising – festival)	/	/	/	/	/	/	/	/	23	9	55
Bratislava (LOVESTREAM – festival)											42
PIEŠŤANY	4	4	17	10	168	7	10	9	3	4	10
Piešťany (Grape - festival)	/	57	80	/	654	3870	/	/	/	/	/
Piešťany (Lodenica - festival)	/	/	5	/	14	8	/	/	/	/	/
NITRA	/	3	5	9	14	11	5	2	9	3	/
KOMÁRNO	/	/	/	3	5	17	9	/	/	/	/
DUNAJSKÁ STREDA	/	6	14	15	5	11	4	/	6	3	/
SEREĎ	/	4	5	5	2	17	8	/	6	1	/
NOVÉ MESTO NAD VÁHOM	/	/	/	/	/	1	/	/	3	/	4
Nové mesto nad váhom/Piešťany (Topfest – festival)	/	25	6	/	/	18	/	/	1	/	/
Nové mesto nad váhom/Piešťany (Lodenica – festival)	/	/	/	/	/	/	/	/	/	/	6
ŽILINA	/	/	9	7	12	8	9	10	3	2	10
BANSKÁ BYSTRICA	3	4	5	11	2	7	4	4	2	2	/
PREŠOV	2	1	4	14	5	10	3	1	5	6	

POPRAĐ	/	5	8	/	/	7	7	5	/	3	/
TRENČÍN (LB)	7	8	8	/	21	24	2	0,4	8	16	15
Trenčín (Pohoda – festival)	/	18	/	/	354	207	/	/	10	/	265
Trenčín (Grape – festival)	/	/	/	/	/	/	/	/	/	/	1767
DNV	2	/	4	3	/	/	1	1	/	/	/
TRENČÍN (PB)	1	/	12	/	/	/	/	/	/	/	/
TRNAVA	/	10	52	38	11	/	5	3	3	4	6
Bratislava Gypsy	/	5	/	/	/	/	/	/	/	/	/
ZVOLEN	2	3	/	/	/	/	/	/	/	/	/
SKALICA	2	2	/	/	/	/	/	/	/	/	/
Skalica – Skalické dni	/	8	/	/	/	/	/	/	/	/	/
PRIEVIDZA	/	3	/	/	/	/	/	/	/	/	/
ČADCA	/	3	/	/	/	/	3,7	/	/	/	/
MARTIN	/	2	/	/	/	/	/	/	/	/	/
HOLÍČ	1	/	/	/	/	/	/	/	/	/	/
LIPTOVSKÝ MIKULÁŠ	/	/	/	/	/	/	/	/	2	/	/

LD – lockdown March–May 2020, year 2023 – monitoring not conducted

Table 6d. Summary Table Compiled from Multiple Reports (2013–2024) Describing the Occurrence of the Secondary Metabolite of the Drug THC in Wastewater from Various Slovak Cities, Including During Festivals and the 2020 Lockdown, Normalized per 1000 Inhabitants

THC-COOH mg/day/1000	Average 2013	Average 2014	Average 2015	Average 2016	Average 2018	Average 2019	Average 2020	Average 2020 LD	Average 2021	Average 2022	Average 2024
PETRŽALKA	32	32	37	24	33	31	24	17	29	10	/
Petržalka (Grape - festival)	/	/	/	/	/	/	/	/	28	/	/
KOŠICE	18	25	22	2	7	21	23	21	14	20	10
BRATISLAVA	27	31	21	27	34	41	28	13	28	40	62
Bratislava (Bažant na mlynoch – festival)	/	/	56	/	/	/	/	/	/	/	/
Bratislava (Hip hop žije – festival)	/	/	/	/	/	47	/	/	31	/	/
Bratislava (Uprising – festival)	/	/	/	/	/	/	/	/	23	25	55
Bratislava (LOVESTREAM – festival)	/	/	/	/	/	/	/	/	/	/	68
PIEŠŤANY	25	17	24	17	24	29	32	26	24	28	61
Piešťany (Grape - festival)	/	24	24	/	45	98	/	/	28	/	/
Piešťany (Lodenica - festival)	/	/	19	/	51	25	/	/	/	/	/
NITRA	/	22	26	12	13	43	32	24	59	31	/
KOMÁRNO	/	/	/	25	21	55	26	/	/	/	/
DUNAJSKÁ STREDA	/	11	22	13	18	34	12	/	105	68	/
SEREĎ	/	12	31	9	16	42	25	/	33	43	/
NOVÉ MESTO NAD VÁHOM	/	/	/	/	/	11	/	/	15	/	11
Nové mesto nad váhom/Piešťany (Topfest – festival)	/	33	31	/	/	11	/	/	12	/	/
Nové mesto nad váhom/Piešťany (Lodenica – festival)											39
ŽILINA	/	/	24	13	15	30	25	33	26	17	17
BANSKÁ BYSTRICA	24	7	21	6	38	21	13	19	16	ND	/

PREŠOV	11	2	24	6	18	34	11	9	3	8	13
POPRAD		6	20	/	/	25	3	5	/	44	/
TRENČÍN (LB)	14	13	26	/	17	38	28	34	55	38	69
Trenčín (Pohoda – festival)	/	33	25	/	24	54	/	/	29	/	93
Trenčín (Grape – festival)	/	/	/	/	/	/	/	/	/	/	97
DNV	46	/	72	6	/	/	16	16	/	/	/
TRENČÍN (PB)	8	/	34	/	/	/	/	/	/	/	/
TRNAVA	/	19	60	34	13	/	34	20	24	39	30
Bratislava Gypsy	/	21	/	/	/	/	/	/	/	/	/
ZVOLEN	16	7	/	/	/	/	/	/	/	/	/
SKALICA	31	18	/	/	/	/	/	/	/	/	/
Skalica – Skalické dni	/	14	/	/	/	/	/	/	/	/	/
PRIEVIDZA	/	29	/	/	/	/	/	/	/	/	/
ČADCA	/	36	/	/	/	/	35	/	/	/	/
MARTIN	/	14	/	/	/	/	/	/	/	/	/
HOLÍČ	16	/	/	/	/	/	/	/	/	/	/
LIPTOVSKÝ MIKULÁŠ	/	/	/	/	/	/	/	/	39	/	/

LD – lockdown March–May 2020, year 2023 – monitoring not conducted

ND – not detected value

List of Published Studies in 2023–2025

- (Articles, books and publications presented at conferences and in international journals)

1. Influent wastewater analysis to investigate emerging trends of new psychoactive substances use in Europe

<https://www.sciencedirect.com/science/article/abs/pii/S0043135424002926>

Abstract

Wastewater-based epidemiology (WBE) can provide objective and timely information on the use of new psychoactive substances (NPS), originally designed as legal alternatives of internationally controlled drugs. NPS have rapidly emerged on the global drug market, posing a challenge to drug policy and constituting a risk to public health. In this study, a WBE approach was applied to monitor the use of more than 300 NPS, together with fentanyl and its main metabolite norfentanyl, in influent wastewater collected from 12 European cities during March-June 2021. Quantitative and qualitative analysis of NPS in composite 24 h influent wastewater samples were based on solid phase extraction and liquid chromatography-mass spectrometry. In-sample stability tests demonstrated the suitability of most investigated biomarkers, except for a few synthetic opioids, synthetic cannabinoids and phenethylamines. [Fentanyl](#), norfentanyl and eight NPS were quantified in influent wastewater and at least three substances were found in each city, demonstrating their use in Europe. N,N-dimethyltryptamine and 3-methylmethcathinone (3-MMC) were the most common NPS found, with the latter having the highest mass loads (up to 24.8 mg/day/1000 inhabitants). Seven additional substances, belonging to five categories of NPS, were identified in different cities. Spatial trends of NPS use were observed between cities and countries, and a changing weekly profile of use

was observed for 3-MMC. WBE is a useful tool to rapidly evaluate emerging trends of NPS use, complementing common indicators (i.e. population surveys, seizures) and helping to establish measures for public health protection.

2. Bridging the gap between research and decision making: A European survey to enhance cooperation in wastewater-based epidemiology (WBE) for illicit drugs

<https://www.sciencedirect.com/science/article/pii/S0033350625000769>

Abstract

Illicit drug use presents a significant challenge to global health and public safety, requiring innovative and effective monitoring strategies. This study aimed to evaluate the current landscape of wastewater-based epidemiology (WBE) for monitoring illicit drugs in Europe, focusing on collaboration, current practices, and barriers, while identifying opportunities for improvement.

Results

The findings indicate a robust research infrastructure and diverse analytical methods among European institutions. Two-thirds of the participating countries reported using WBE data to inform policy. However, challenges persist, particularly in securing funding and coordination, as well as generating national estimates from multiple locations and addressing specific local policy needs.

Conclusions

WBE has proven to be a valuable tool for monitoring illicit drug trends and informing drug policies. To unlock its full potential, sustained funding, methodological standardization, and enhanced cooperation are essential. This study provides critical insights into the European WBE landscape, offering a roadmap for strengthening the integration of actionable WBE data into public health and policy frameworks.

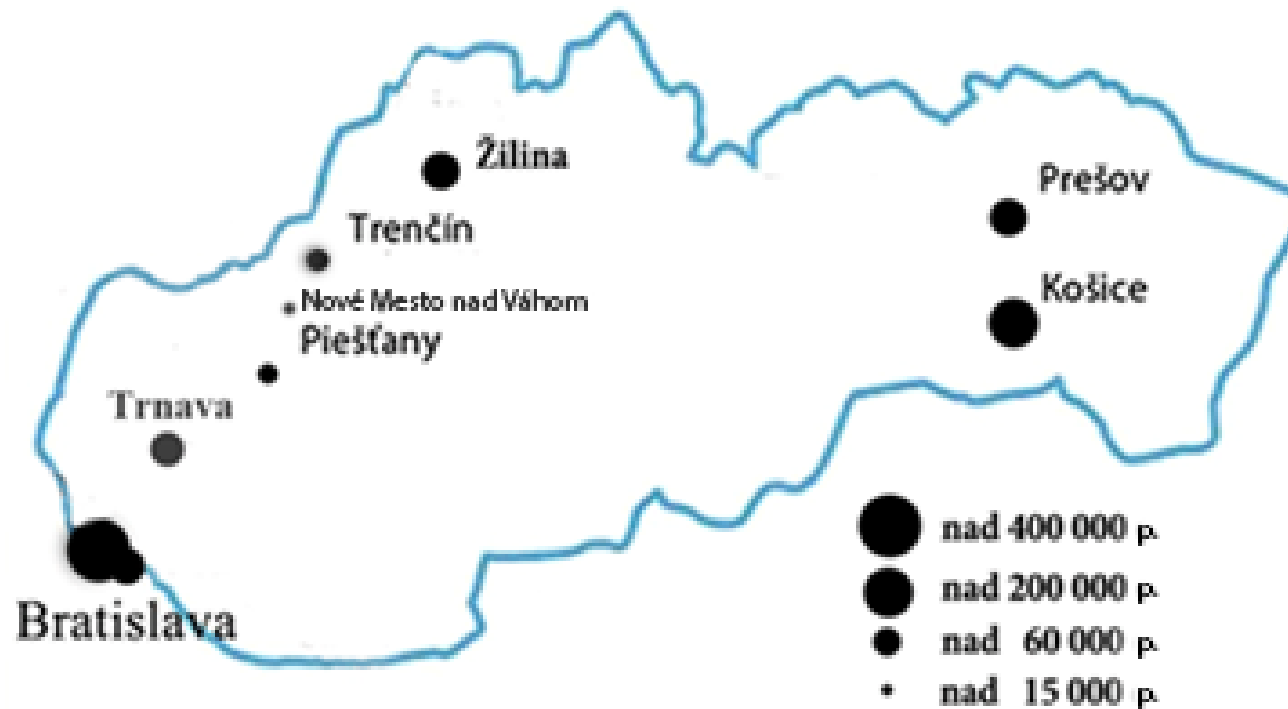
3. Monitoring Alcohol Consumption in Slovak Cities during the COVID-19 Lockdown by Wastewater-Based Epidemiology

<https://www.mdpi.com/1660-4601/20/3/2176>

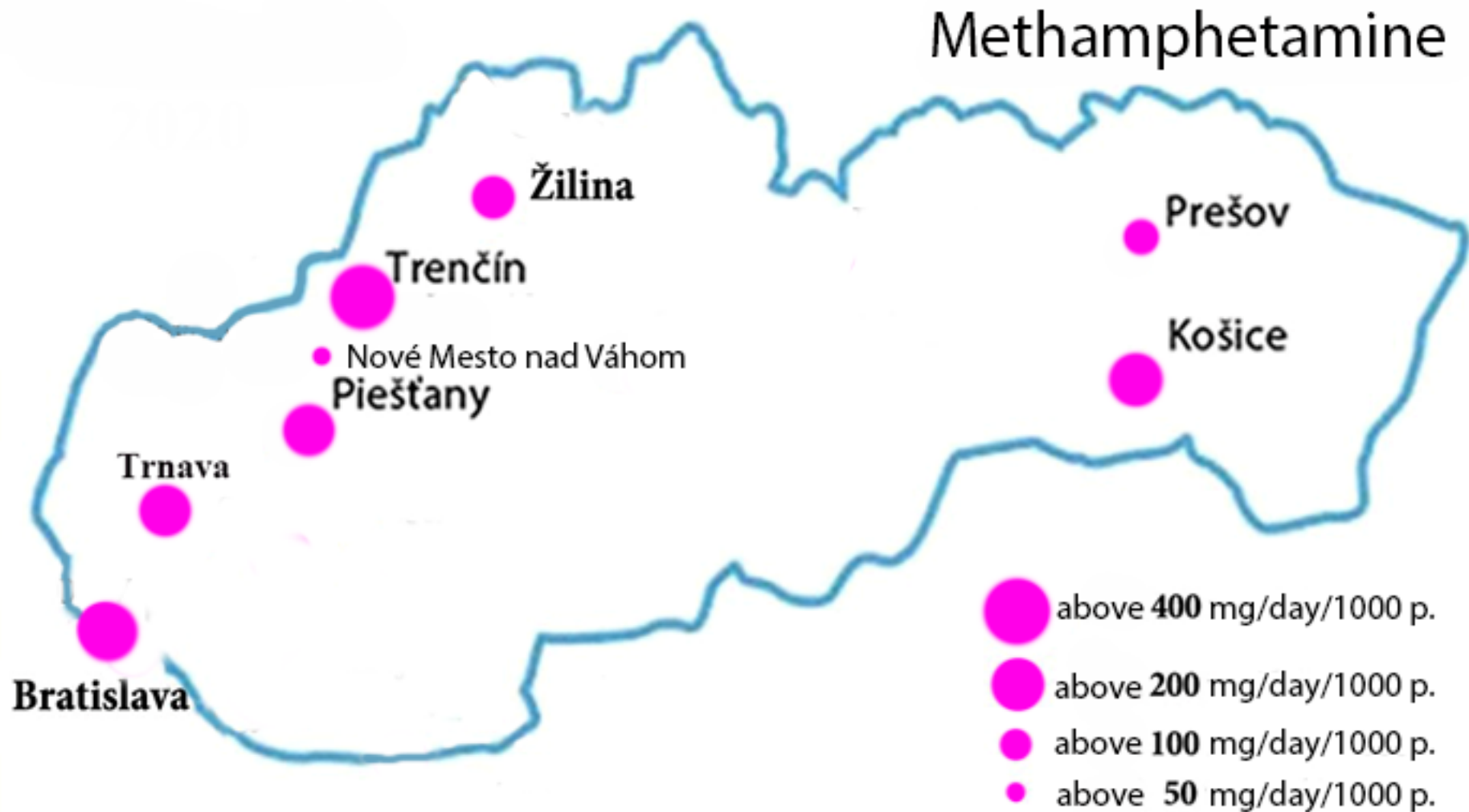
Abstract

The consumption of alcohol in a population is usually monitored through individual questionnaires, forensics, and toxicological data. However, consumption estimates have some biases, mainly due to the accumulation of alcohol stocks. This study's objective was to assess alcohol consumption in Slovakia during the COVID-19 pandemic-related lockdown using wastewater-based epidemiology (WBE). Samples of municipal wastewater were collected from three Slovak cities during the lockdown and during a successive period with lifted restrictions in 2020. The study included about 14% of the Slovak population. The urinary alcohol biomarker, ethyl sulfate (EtS), was analyzed by liquid chromatography-tandem mass spectrometry (LC-MS/MS). EtS concentrations were used to estimate the per capita alcohol consumption in each city. The average alcohol consumption in the selected cities in 2020 ranged between 2.1 and 327 L/day/1000 inhabitants and increased during days with weaker restrictions. WBE can provide timely information on alcohol consumption at the community level, complementing epidemiology-based monitoring techniques (e.g., population surveys and sales statistics).

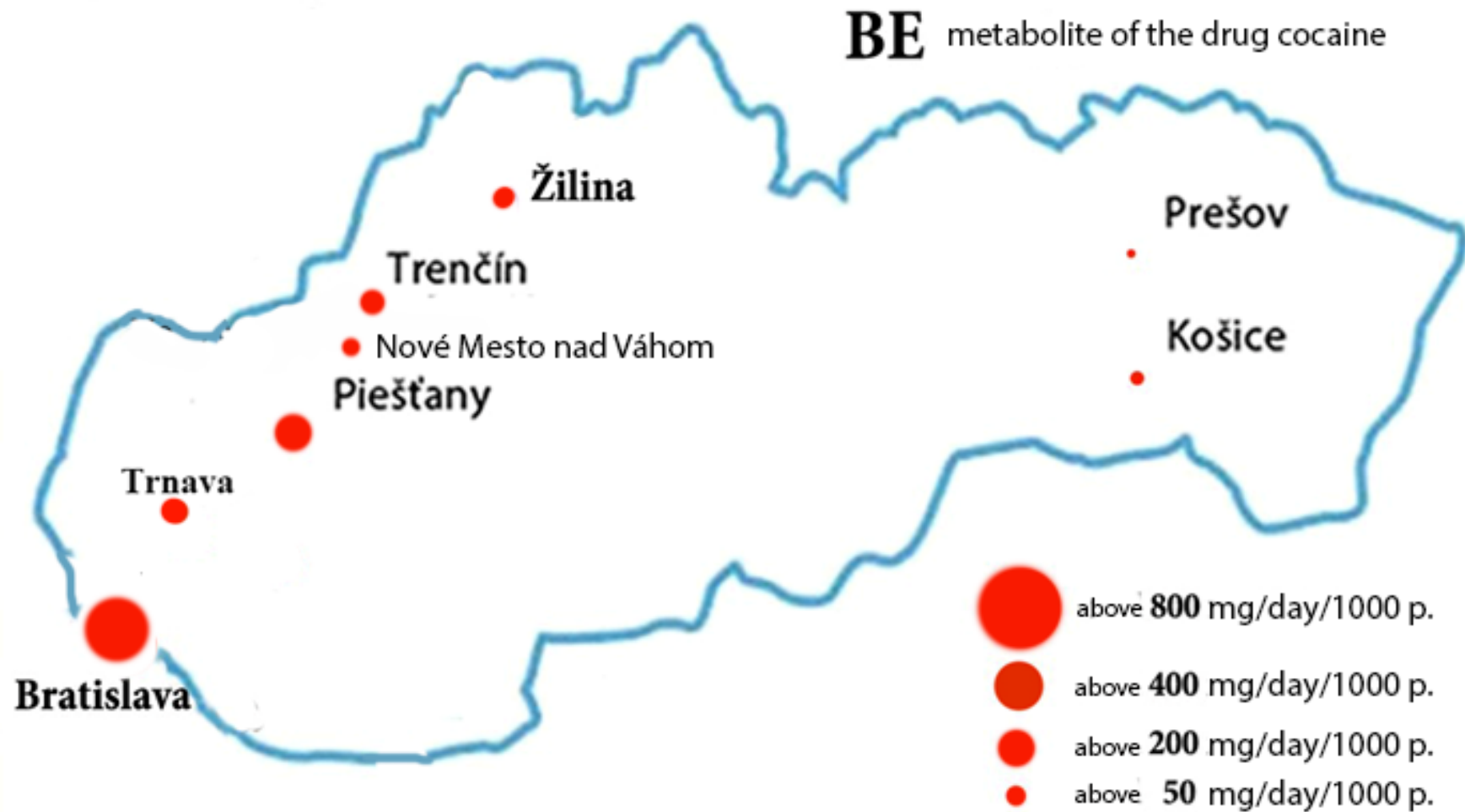
Summary Maps of Drug Occurrence in Wastewater in Slovakia for 2024



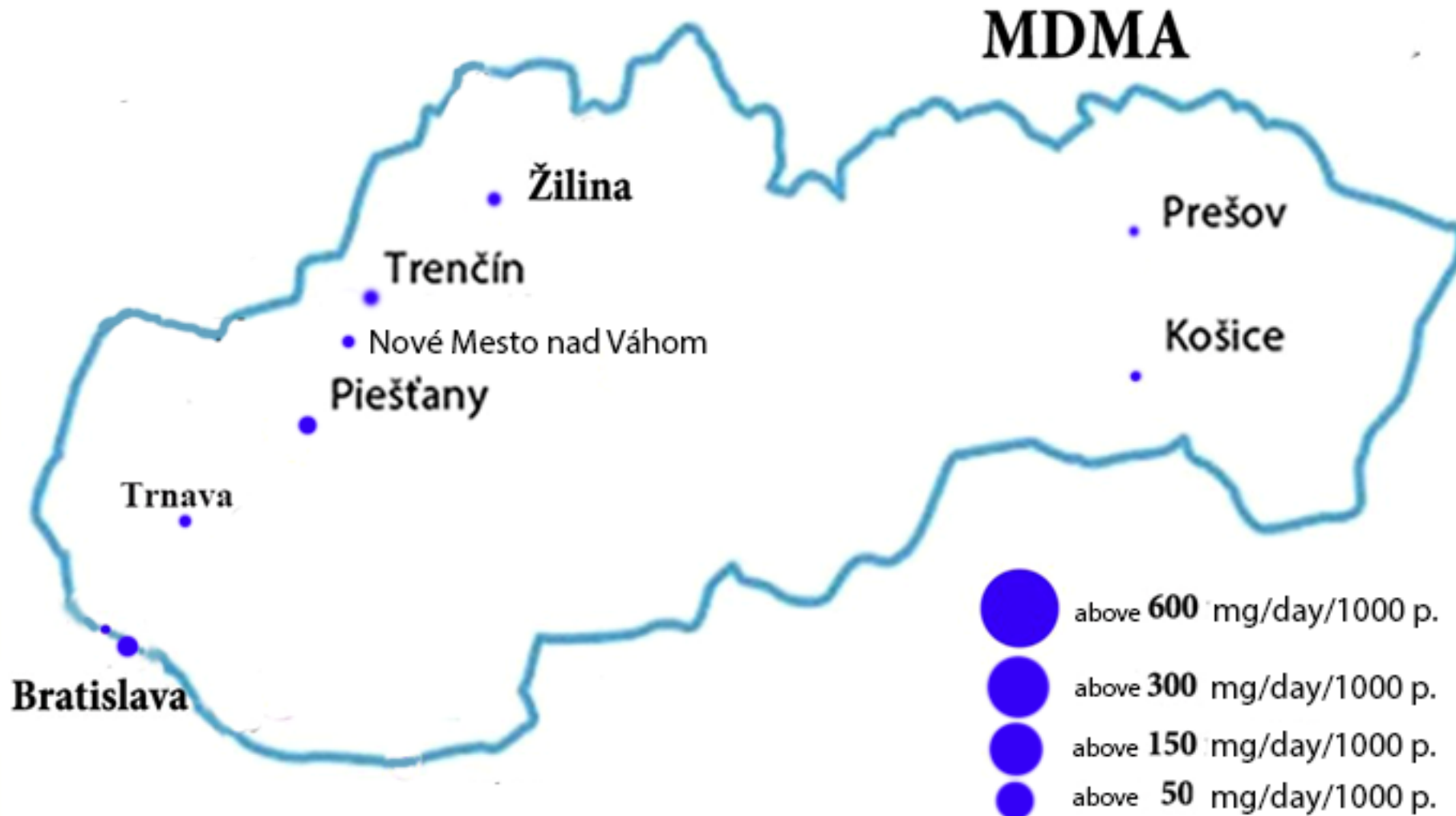
Map of Slovakia with Marked Monitored Cities



Map of Slovakia – Occurrence of the Drug Methamphetamine in Wastewater in the Slovak Republic – 2024

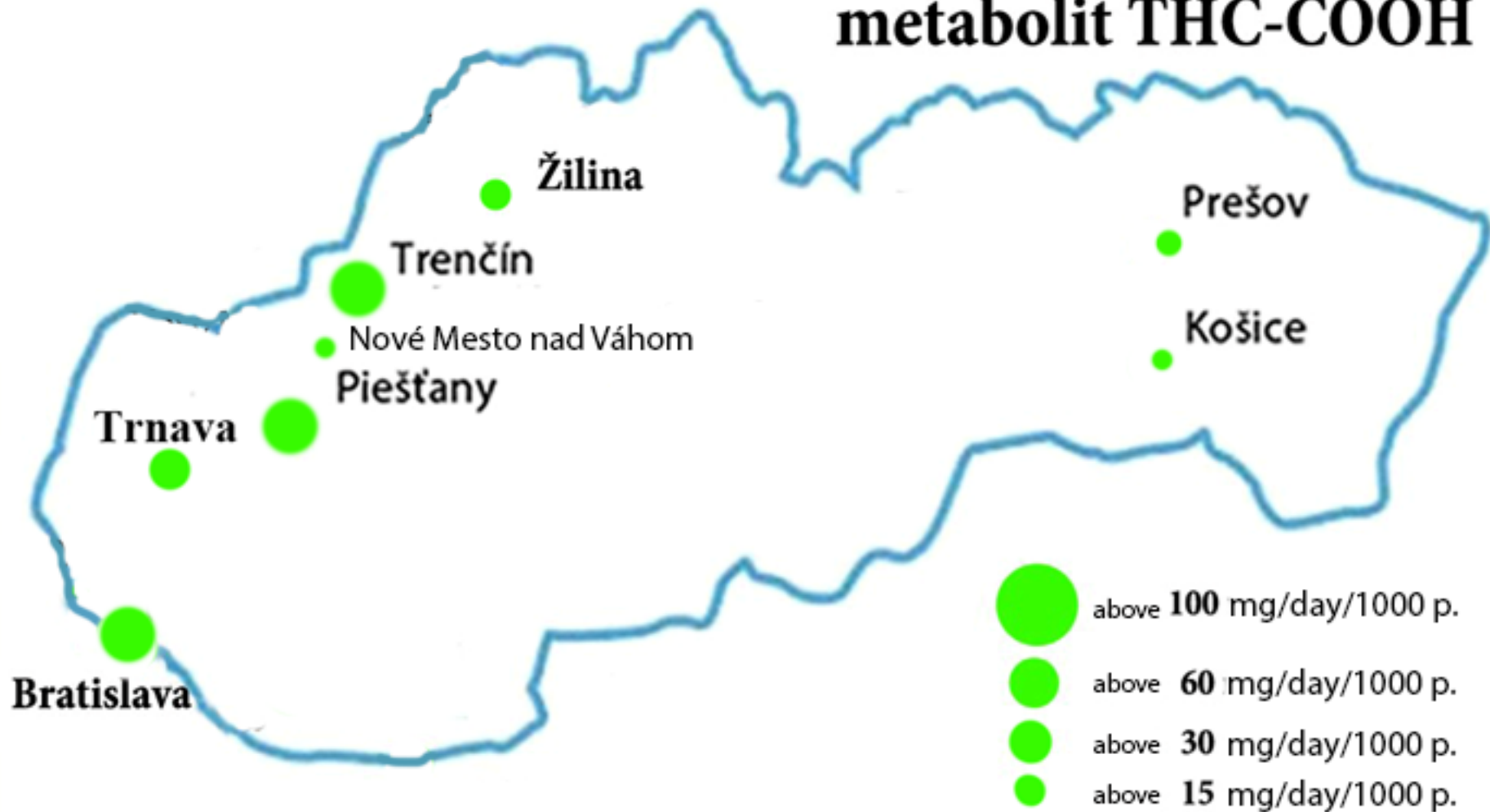


Map of Slovakia – Occurrence of the Cocaine Metabolite (BE) in Wastewater in the Slovak Republic – 2024



Map of Slovakia – Occurrence of the Drug MDMA in Wastewater in the Slovak Republic – 2024

metabolit THC-COOH



Map of Slovakia – Occurrence of the Secondary Metabolite THC-COOH in Wastewater in the Slovak Republic – 2024

