

Desorption Electrospray Ionization Tandem Mass Spectrometry for Rapid Detection of 24 Carcinogenic Aromatic Amines in Textiles

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Supporting Information

Table S1 Linear signal responses of o-anisidine deposited on the cotton textile surface

Concentration of aromatic amine on surface (fg/mm ²)	Absolute signal intensity of the protonated aromatic amine (m/z124)						Mean value of the signal intensity	Standard deviation	Relative standard deviation (%)
20.0	1180	1220	1060	1150	1030	1110	1125	72.3	6.4
200.0	2130	2290	1910	2220	2090	2020	2110	136.7	6.5
2000.0	3310	3290	3180	3140	3090	3400	3235	117.4	3.6
20000.0	4120	4260	4030	3720	3910	3860	3983	193.6	4.9
200000.0	5180	4970	5050	4820	4710	5100	4972	177.5	3.6
2000000.0	6560	6370	6450	6220	6110	6500	6368	172.9	2.7

The LOD was calculated using the equation: $LOD=3\sigma c/S$; where σ was the standard deviation of the 6 measurements performed on the blank sample; c was the minimal concentration of a standard solution used to obtain the calibration curve; S was the mean value of the signal of analytes at the concentration c. In this case,

$$LOD = \frac{3\sigma c}{S} = \frac{3 \times 66.0 \times 20}{1125} = 3.5 \text{ fg/mm}^2.$$

Table S2 Linear signal responses of 4-methoxy-1, 3-phenylene diamine deposited on the cotton textile surface

Concentration of aromatic amine on surface (fg/mm ²)	Absolute signal intensity of the protonated aromatic amine (m/z139)						Mean value of the signal intensity	Standard deviation	Relative standard deviation (%)
20.0	1830	1760	1970	1820	1840	1910	1855	74.0	4.0
200.0	3380	3300	3290	3420	3190	3070	3275	128.2	3.9
2000.0	4860	4720	4830	4610	4790	4950	4793	117.8	2.5
20000.0	6010	6240	6170	6100	5920	5890	6055	139.2	2.3
200000.0	7310	7680	7450	7180	7260	7350	7372	175.9	2.4
2000000.0	9580	9730	10100	9860	9980	9640	9815	201.8	2.1

Table S3 Linear signal responses of o-toluidine deposited on the cotton textile surface

Concentration of aromatic amine on surface (fg/mm ²)	Absolute signal intensity of the protonated aromatic amine (m/z108)						Mean value of the signal intensity	Standard deviation	Relative standard deviation (%)
20.0	3870	3760	3790	3930	3840	3890	3847	63.5	1.7
200.0	14800	14600	15300	14100	14400	13800	14500	529.2	3.7
2000.0	25900	25300	24500	25600	26100	25700	25517	567.2	2.2
20000.0	39800	38500	39100	41700	40800	38900	39800	1232.9	3.1
200000.0	50900	51700	47300	52600	48400	49700	50100	2016.9	4.0
2000000.0	66600	70800	68300	62900	64100	66900	66600	2848.2	4.3

Table S4 Linear signal responses of 2,4,5-trimethylaniline deposited on the cotton textile surface

Concentration of aromatic amine on surface (fg/mm ²)	Absolute signal intensity of the protonated aromatic amine (m/z136)						Mean value of the signal intensity	Standard deviation	Relative standard deviation (%)
20.0	2160	2110	2030	2140	2070	2250	2127	76.6	3.6
200.0	3960	4120	4030	4140	4240	3780	4045	161.5	4.0
2000.0	6190	6080	6010	6480	6350	6110	6203	178.6	2.9
20000.0	9680	9890	9450	9470	9620	9760	9645	169.6	1.8
200000.0	11800	12400	11900	12200	11500	11700	11917	331.2	2.8
2000000.0	13800	14100	14200	14500	14000	13700	14050	288.1	2.1

Table S5 Linear signal responses of 2-methoxy-5-methylaniline deposited on the cotton textile surface

Concentration of aromatic amine on surface (fg/mm ²)	Absolute signal intensity of the protonated aromatic amine (m/z138)						Mean value of the signal intensity	Standard deviation	Relative standard deviation (%)
20.0	1250	1220	1280	1130	1180	1260	1220	56.2	4.6
200.0	2050	2120	2180	2260	2220	2010	2140	97.8	4.6
2000.0	3780	3700	3650	3860	3980	3830	3800	118.2	3.1
20000.0	4880	4780	4720	4960	4920	5050	4885	120.3	2.5
200000.0	6760	6780	6870	6670	6890	6570	6757	121.3	1.8
2000000.0	7970	8070	8620	8180	8170	8240	8208	223.0	2.7

Table S6 Linear signal responses of 2-aminonaphthalene deposited on the cotton textile surface

Concentration of aromatic amine on surface (fg/mm ²)	Absolute signal intensity of the protonated aromatic amine (m/z144)						Mean value of the signal intensity	Standard deviation	Relative standard deviation (%)
20.0	3250	3360	3450	3330	3280	3380	3347	71.9	2.2
200.0	8300	8020	8240	8660	8460	8290	8328	215.6	2.6
2000.0	14200	14400	14100	13600	14900	13900	14183	444.6	3.1
20000.0	17200	17400	17800	18300	18800	18000	17917	587.9	3.3
200000.0	25000	26800	25700	26200	25900	25300	25817	643.2	2.5
2000000.0	31400	30500	30800	32900	32200	31700	31583	888.6	2.8

Table S7 Linear signal responses of benzidine deposited on the cotton textile surface

Concentration of aromatic amine on surface (fg/mm ²)	Absolute signal intensity of the protonated aromatic amine (m/z185)						Mean value of the signal intensity	Standard deviation	Relative standard deviation (%)
20.0	3070	3080	2950	3050	3120	3150	3070	69.0	2.3
200.0	8100	8380	8010	8430	8150	8200	8212	163.1	2.0
2000.0	12800	12500	12300	12700	13300	13100	12783	371.0	2.9
20000.0	16200	16500	16900	16700	17300	17100	16783	402.1	2.4
200000.0	21500	21200	21400	20500	20100	20300	20833	605.5	2.9
2000000.0	26900	25400	25500	25900	26300	26700	26117	621.0	2.4

Table S8 Linear signal responses of p-phenylazoaniline deposited on the cotton textile surface

Concentration of aromatic amine on surface (fg/mm ²)	Absolute signal intensity of the protonated aromatic amine (m/z 198)						Mean value of the signal intensity	Relative Standard deviation	Standard deviation (%)
20.0	3590	3560	3500	3670	3690	3530	3590	76.2	2.1
200.0	9620	9100	9390	9570	9540	9840	9510	248.2	2.6
2000.0	15100	14500	14200	14800	14000	14400	14500	400.0	2.8
20000.0	18500	19900	19600	18900	20200	19900	19500	660.3	3.4
200000.0	25100	27800	27200	26400	26100	25500	26350	1017.3	3.9
2000000.0	35400	34600	35100	35400	34100	33200	34633	864.1	2.5

Table S9 Linear signal responses of 4, 4' - methylenedianiline deposited on the cotton textile surface

Concentration of aromatic amine on surface (fg/mm ²)	Absolute signal intensity of the protonated aromatic amine (m/z 199)						Mean value of the signal intensity	Relative Standard deviation	Standard deviation (%)
20.0	3690	3840	3820	3740	3890	3800	3797	71.7	1.9
200.0	16800	16000	15800	17800	17500	16400	16717	806.0	4.8
2000.0	26200	27200	24400	25600	25100	26800	25883	1055.3	4.1
20000.0	32900	33500	36500	36200	35200	34500	34800	1442.2	4.1
200000.0	47200	49600	48400	46600	45700	46200	47283	1467.5	3.1
2000000.0	62600	64300	59800	60500	61700	63900	62133	1807.4	2.9