

Supplementary Material

Simultaneous determination of polybrominated diphenyl ethers, polycyclic aromatic hydrocarbons and their hydroxylated metabolites in human hair: A potential methodology to distinguish external from internal exposure

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Fig. S1 Loading plot of PLS-DA

Table S1 General demographic characteristics of the hair donors who participated in the present study

	n	Age (years)	Height (cm)	Weight (kg)	BMI (kg m⁻²)	Hair internal lipid content (%)	Hair external lipid content (%)
E-waste dismantling worker	10	41 (26–52)	165 (150–180)	65 (53–85)	24 (22–26)	0.9 (0.5–1.6)	1.5 (0.6–2.4)
Resident	10	52 (45–61)	167 (160–174)	71 (62–80)	25 (22–29)	0.6 (0.2–0.9)	3 (0.7–10)

BMI: body mass index.

Table S2 Parameters of GC-MS-MS analysis for PAHs in human hair

Compound name	Analyte	Transition 1	Collision	Transition 1	Collision	Retention time
	abbreviation	(m/z)	energy (eV)	(m/z)	energy (eV)	(min)
Naphthalene-d ₈	Nap-d ₈	136→108	15		15	6.615
Naphthalene	Nap	128→102	15	128→78	15	6.660
Hexamethylbenzene	HMB	147→119	15		15	10.204
Acenaphthylene	Acy	152→151	15	152→126	15	10.280
Acenaphthene-d ₁₀	Ace-d ₁₀	164→162	15		15	10.625
Acenaphthene	Ace	154→153	15	154→152	15	10.701
Fluorene	Flu	166→165	15	165→164	15	11.939
Phenanthrene-d ₁₀	Phe-d ₁₀	188→160	15		15	14.294
Phenanthrene	Phe	178→152	15	178→176	15	14.361
Anthracene	Ant	178→152	15	178→176	15	14.518
Fluoranthene	Flua	202→200	15	101→88	15	19.007
Pyrene	Pyr	202→201	15	101→88	15	20.133
Benz[a]anthracene	B[a]A	228→226	15	226→224	15	28.627
Chrysene-d ₁₂	Chr-d ₁₂	240→236	15		15	28.675
Chrysene	Chr	228→226	15	228→202	15	28.883
Benzo[b]fluoranthene	B[b]F	252→250	15	250→248	15	37.857
Benzo[k]fluoranthene	B[k]F	252→250	15	126→113	15	38.111
Benzo[a]pyrene	B[a]P	252→250	15	250→248	15	40.512
Perylene-d ₁₂	Per-d ₁₂	264→260	15		15	41.016
Indeno[1,2,3-cd]pyrene	InP	276→274	15	138→137	15	47.353
Dibenz[a,h]anthracene	D[a,h]A	278→276	15	276→274	15	47.622
Benzo[ghi]perylene	B[ghi]P	276→274	15	138→137	15	48.308

Table S3 Parameters of LC-MS-MS analysis for OH-PAHs in human hair

Compound name	Analyte abbreviation	MRM (m/z)	Fragmentor	Collision energy	Retention time
			(eV)	(eV)	(min)
2-Hydroxynaphthalene-d ₇	2-OH-Nap-d ₇	150→122	160	34	8.256
2-Hydroxynaphthalene	2-OH-Nap	143→115	140	30	8.433
1-Hydroxynaphthalene	1-OH-Nap	143→115	140	28	9.013
2-Hydroxyfluoren-d ₉	2-OH-Flu-d ₉	190→188	140	30	11.387
3-Hydroxyfluoren	3-OH-Flu	181→153	110	20	11.487
2-Hydroxyfluoren	2-OH-Flu	181→180	120	25	11.609
2-Hydroxyphenanthrene	2-OH-Phe	193→165	170	34	12.370
3-Hydroxyphenanthrene	3-OH-Phe	193→165	160	34	12.514
¹³ C ₆ -3-Hydroxyphenanthrene	¹³ C ₆ -3-OH-Phe	199→171	160	34	12.513
1/9-Hydroxyphenanthrene	1/9-OH-Phe	193→165	170	34	13.003
4-Hydroxyphenanthrene	4-OH-Phe	193→165	170	34	13.329
1-hydroxypyrene-d ₉	1-OH-Pyr-d ₉	226→198	200	42	14.725
1-hydroxypyrene	1-OH-Pyr	217→189	170	40	14.953
2'-hydroxy-2,4,4'-tribromodiphenyl ether	2'-OH-BDE-28	421→79	90	13	7.762
6-hydroxy-2,2',4,4'-tetrabromodiphenyl ether	6-OH-BDE-47	501→79	110	21	9.798
6'-hydroxy-2,2',4,4'-pentabromodiphenyl ether	6'-OH-BDE-99	579→79	110	17	13.182
3'-hydroxy-2,2',4,4'-hexabromodiphenyl ether	3'-OH-BDE-154	659→79	180	50	14.421

Table S4 Validation parameters of the analytical method

Compounds	LOD (pg)	LOQ (pg)	Spiked mass (ng)		Recovery (%) (n=3)		Accuracy (%) (n=6)		RSD (%) (n=6)	
			Low level	High Level	Low level	High level	Intra-day	Inter-day	Intra-day	Inter-day
			BDE-17	0.05	0.2	0.5	4	109.9	104.0	99.9
BDE-28	0.05	0.15	0.5	4	93.7	106.7	100.5	99.1	4.5	18.6
BDE-71	0.05	0.15	0.5	4	94.3	89.9	95.2	100.8	3.1	4.3
BDE-47	0.05	0.15	0.5	4	132.8	98.5	99.7	98.2	3.8	5.9
BDE-66	0.05	0.2	0.5	4	145.3	94.3	101.2	100.5	4.2	4.3
BDE-100	0.05	0.15	0.5	4	99.3	97.7	95.6	98.0	4.6	7.7
BDE-99	0.05	0.15	0.5	4	94.9	104.9	95.0	97.0	6.0	6.2
BDE-85	0.05	0.15	0.5	4	121.1	106.6	98.0	98.6	7.4	10.8
BDE-154	0.05	0.2	0.5	4	110.5	110.0	92.0	97.8	6.1	7.6
BDE-153	0.05	0.15	0.5	4	104.6	125.4	93.5	97.0	7.0	12.3
BDE-138	0.05	0.15	0.5	4	113.9	102.4	89.5	98.9	8.2	10.7
BDE-183	0.05	0.20	0.5	4	97.8	102.5	93.9	96.5	8.5	8.5
BDE-190	0.10	0.5	0.5	4	104.6	97.0	84.3	97.5	9.5	8.7
BDE-197	0.08	0.2	2.5	20	103.4	106.4	114.7	99.2	11.3	17.0
BDE-203	0.1	0.25	2.5	20	89.2	93.2	98.0	99.1	7.6	12.7
BDE-196	0.1	0.25	2.5	20	82.6	91.7	108.3	98.6	8.9	14.5
BDE-208	0.2	0.4	2.5	20	92.9	87.1	106.7	98.8	8.3	9.2
BDE-207	0.13	0.25	2.5	20	81.2	84.6	102.4	99.7	8.3	11.2
BDE-206	0.25	0.5	2.5	20	68.9	62.0	103.3	98.6	4.7	4.8
BDE-209	0.5	0.9	2.5	20	64.0	69.3	105.2	97.9	12.0	17.1
Nap	0.05	0.1	5	40	48.4	56.8	50.2	66.8	18.7	24.5
Acy	0.05	0.1	5	40	112.7	106.4	95.5	99.5	7.0	15.0
Ace	0.05	0.1	5	40	111.6	101.0	98.6	99.6	6.6	14.0
Flu	0.05	0.1	5	40	111.0	134.5	100.1	90.1	6.1	13.7
Phe	0.8	1.5	5	40	120.6	85.0	100.3	99.2	12.1	8.3

Ant	1	2	5	40	94.3	79.8	104.6	108.3	4.2	9.5
Flua	0.5	1	5	40	97.8	81.2	95.5	100.6	9.2	16.3
Pyr	0.1	0.5	5	40	98.3	83.4	101.0	100.9	7.8	18.2
B[a]A	15	25	5	40	98.0	106.9	94.3	98.3	5.0	10.2
Chr	15	25	5	40	94.4	105.6	95.1	98.3	5.5	10.5
B[b]F	15	20	5	40	103.5	87.1	91.1	98.3	5.3	9.8
B[k]F	15	20	5	40	97.2	83.4	90.2	96.4	4.6	9.7
B[a]P	15	25	5	40	104.0	87.8	94.8	97.6	3.6	9.7
D[a,h]A	15	20	5	40	96.7	111.8	105.6	104.6	5.8	11.6
InP	15	20	5	40	93.7	105.6	98.8	97.2	4.7	17.1
B[ghi]P	5	10	5	40	94.5	101.7	91.9	96.0	5.2	10.4
2-OH-Nap	2	5	25	200	128.0	102.7	109.4	100.0	9.2	13.8
1-OH-Nap	5	12.5	2.5	20	60.0	82.7	104.8	98.6	0.7	2.6
3-OH-Flu	25	50	2.5	20	109.9	111.4	116.1	102.1	3.5	19.5
2-OH-Flu	0.5	3	2.5	20	143.6	146.1	106.0	100.8	4.7	2.6
2-OH-Phe	0.3	0.8	2.5	20	103.3	77.2	101.9	97.8	4.7	8.6
3-OH-Phe	0.2	0.6	2.5	20	98.4	96.3	99.7	98.3	4.1	5.8
1/9-OH-Phe	0.3	1	2.5	20	77.0	81.8	97.6	98.7	4.3	17.8
4-OH-Phe	0.5	2	2.5	20	110.7	117.2	98.5	101.5	4.5	3.0
1-OH-Pyr	0.5	1	2.5	20	66.7	77.0	97.3	99.7	2.3	10.6
2'-OH-BDE28	0.05	0.2	2	20	74.6	78.3	95.3	80.6	4.4	2.6
6-OH-BDE47	0.05	0.2	2	20	70.6	86.3	95.6	88.0	9.5	7.5
6'-OH-BDE99	0.05	0.2	2	20	63.4	88.3	100.4	99.0	10.1	10.9
3'-OH-BDE154	0.15	0.5	2	20	60.2	85.0	97.7	94.4	5.6	7.2

Table S5 Concentrations of PBDEs in hair samples (ng g⁻¹ dw)

Compounds	Resident (n=10)								Worker (n=10)							
	Internal				External				Internal				External			
	Mean	SD	Median	Range	Mean	SD	Median	Range	Mean	SD	Median	Range	Mean	SD	Median	Range
BDE-17	0.06	0.06	0.04	0.01-0.21	0.06	0.04	0.05	0.01-0.14	0.68	0.45	0.58	0.24-1.77	0.45	0.34	0.30	0.17-1.26
BDE-28	0.26	0.28	0.18	0.06-1.03	0.29	0.21	0.21	0.05-0.63	4.31	2.87	3.27	1.42-9.84	2.50	1.71	1.72	0.79-6.26
BDE-71	0.07	0.11	0.02	0.01-0.33	0.07	0.13	0.03	0.01-0.43	0.49	0.57	0.32	0.20-2.10	0.20	0.07	0.18	0.12-0.33
BDE-47	0.47	0.40	0.35	0.09-1.36	0.65	0.51	0.48	0.12-1.57	7.14	2.95	6.79	3.29-12.9	5.86	2.40	5.51	3.20-11.4
BDE-66	0.13	0.12	0.09	0.02-0.41	0.17	0.14	0.12	0.03-0.43	1.62	0.71	1.55	0.73-3.07	1.40	0.64	1.28	0.57-2.65
BDE-100	0.02	0.01	0.02	ND-0.04	0.05	0.03	0.03	0.02-0.08	0.30	0.30	0.17	0.03-1.03	0.35	0.21	0.30	0.10-0.73
BDE-99	0.15	0.10	0.12	0.05-0.37	0.29	0.26	0.16	0.06-0.81	2.78	1.46	2.43	0.81-6.02	2.84	0.84	2.79	1.41-4.23
BDE-85	0.008	0.007	0.008	ND-0.02	0.02	0.02	0.01	ND-0.04	0.12	0.06	0.11	0.04-0.25	0.13	0.03	0.13	0.07-0.19
BDE-154	0.01	0.009	0.008	0.001-0.03	0.04	0.03	0.03	0.001-0.1	0.22	0.18	0.14	0.03-0.55	0.24	0.12	0.17	0.11-0.48
BDE-153	0.03	0.02	0.02	0.01-0.08	0.12	0.11	0.06	0.02-0.31	0.49	0.35	0.38	0.10-1.11	0.64	0.27	0.51	0.35-1.05
BDE-138	0.003	0.004	ND	ND-0.01	0.01	0.02	0.01	ND-0.05	0.04	0.02	0.04	0.01-0.08	0.07	0.02	0.05	0.05-0.12
BDE-183	0.04	0.05	0.02	0.002-0.18	0.26	0.31	0.10	0.02-1.00	0.49	0.55	0.22	0.06-1.55	0.99	0.73	0.85	0.20-2.38
BDE-190	0.003	0.01	ND	ND-0.03	0.02	0.03	ND	ND-0.07	0.06	0.03	0.05	0.02-0.12	0.10	0.04	0.10	0.03-0.17
BDE-197	0.01	0.02	0.003	0.002-0.06	0.05	0.06	0.01	0.002-0.13	0.27	0.19	0.20	0.08-0.70	0.19	0.13	0.16	0.05-0.45
BDE-203	0.02	0.02	0.02	0.004-0.05	0.05	0.05	0.04	0.002-0.14	0.17	0.09	0.17	0.03-0.36	0.16	0.07	0.14	0.09-0.30
BDE-196	0.07	0.17	0.01	0.003-0.56	0.05	0.05	0.04	0.003-0.13	0.26	0.15	0.25	0.07-0.60	0.17	0.08	0.14	0.10-0.33
BDE-208	0.11	0.10	0.08	0.006-0.32	0.31	0.22	0.23	0.07-0.69	0.92	0.31	1.01	0.21-1.36	0.79	0.16	0.78	0.56-1.03
BDE-207	0.17	0.14	0.13	0.02-0.47	0.46	0.32	0.35	0.12-1.02	1.45	0.50	1.54	0.34-2.28	1.31	0.26	1.28	0.98-1.78
BDE-206	0.04	0.07	0.01	0.005-0.21	0.48	0.38	0.34	0.06-1.17	0.87	0.45	0.89	0.03-1.53	1.53	0.34	1.46	1.10-2.12
BDE-209	4.22	4.02	2.36	0.78-12.5	16.4	14.1	11.6	3.98-48.9	48.5	20.2	52.5	5.32-74.2	63.3	8.24	64.39	49.0-74.8
Σ ₂₀ PBDEs	5.90	4.72	4.23	1.31-15.4	19.9	16.6	13.5	4.68-57.1	71.2	26.7	76.5	16.8-106	83.2	12.7	84.8	61.4-106

SD: standard deviation.

ND: not detected

Table S6 Concentrations of PAHs in the hair (ng g⁻¹ dw)

Compounds	Resident (n=10)								Worker (n=10)							
	Internal				External				Internal				External			
	Mean	SD	Median	Range	Mean	SD	Median	Range	Mean	SD	Median	Range	Mean	SD	Median	Range
Nap	5.62	2.33	6.38	2.31-8.24	6.13	4.16	6.17	0.62-12.0	11.5	3.00	11.4	5.43-15.4	5.48	3.11	5.76	0.89-11.5
Acy	1.20	0.42	1.29	0.50-1.69	0.86	0.46	0.68	0.39-1.84	1.76	0.83	1.65	0.29-3.47	0.86	0.36	0.96	0.15-1.25
Ace	1.80	0.95	1.83	0.29-2.89	2.38	1.40	2.35	0.53-5.41	2.64	0.90	2.85	1.00-3.72	2.49	0.97	2.43	0.65-3.88
Flu	5.06	2.00	5.10	1.98-8.77	3.49	2.22	2.96	1.08-8.85	7.91	1.71	8.00	4.58-10.9	3.82	1.42	4.10	1.08-5.69
Phe	47.1	21.6	42.3	18.4-78.9	17.6	12.0	12.6	5.37-40.5	74.2	40.8	63.3	37.5-176	17.0	9.93	14.2	4.55-30.4
Ant	4.91	2.14	4.62	1.92-9.02	2.41	1.76	1.60	0.73-6.21	8.05	5.68	6.58	3.44-22.8	5.65	11.2	1.98	0.56-37.1
Flua	31.6	17.6	31.0	11.1-63.4	23.9	21.2	21.1	7.01-78.8	66.0	62.7	35.6	20.7-225	22.7	14.1	18.2	5.37-47.2
Pyr	34.1	21.9	34.4	11.8-83.5	26.0	20.5	23.0	7.05-72.56	59.8	49.2	36.4	19.9-180	23.4	14.4	19.2	6.12-47.1
B[a]A	8.82	10.5	4.76	1.18-30.0	8.45	9.95	3.35	1.10-31.5	10.0	8.50	5.48	3.26-29.9	4.53	2.64	4.27	1.40-10.0
Chr	13.6	10.93	10.8	2.99-39.8	12.71	10.8	7.80	1.84-31.5	29.7	24.5	16.6	9.20-83.1	13.8	10.5	10.6	2.28-32.2
B[b]F	3.70	3.31	2.87	0.15-10.3	4.02	3.66	2.14	0.59-9.33	9.01	8.44	4.80	0.77-28.0	5.10	2.72	4.59	1.64-9.71
B[k]F	0.92	1.02	0.65	0.15-3.00	1.14	1.06	0.65	0.25-2.98	2.12	1.87	1.12	0.61-6.36	1.24	0.69	1.08	0.40-2.31
B[a]P	2.01	2.41	1.16	0.15-6.70	2.47	2.54	1.48	0.64-8.23	2.64	1.92	1.38	0.97-5.45	1.68	0.72	1.69	0.83-2.81
D[a,h]A	0.27	0.24	0.15	0.15-0.79	0.37	0.40	0.15	0.15-1.26	2.51	0.41	0.36	0.15-1.38	0.37	0.19	0.35	0.15-0.70
InP	1.58	1.83	0.89	0.30-5.55	1.85	2.30	0.87	0.31-6.57	0.54	2.16	1.47	0.74-7.61	1.39	0.74	1.20	0.55-2.44
B[ghi]P	1.87	1.60	1.36	0.44-5.03	2.08	2.24	1.24	0.39-6.39	3.17	2.57	1.75	0.81-8.79	1.64	0.86	1.39	0.67-2.88
Σ ₁₆ PAHs	164.2	80.1	160	56.5-320.9	116	79.9	104	36.9-285	292	207	185	124-796	111	67.9	87.7	27.4-242

SD: standard deviation.

Table S7 Concentrations of OH-PAHs in the hair (ng g⁻¹ dw)

Compounds	Resident (n=10)								Worker (n=10)							
	Internal				External				Internal				External			
	Mean	SD	Median	Range	Mean	SD	Median	Range	Mean	SD	Median	Range	Mean	SD	Median	Range
2-OH-Nap	120	74.8	99.1	54.0-302	7.42	7.22	5.27	1.64-25.7	111	54.2	108	36.0-203	6.69	4.51	5.87	1.57-12.6
1-OH-Nap	19.7	28.4	6.35	1.27-88.4	1.46	1.95	0.98	ND-6.28	16.2	13.8	14.3	2.60-49.1	0.19	0.41	ND	ND-1.14
3-OH-Flu	8.64	11.2	5.85	ND-37.5	0.31	0.37	0.25	ND-1.06	11.2	7.33	10.5	1.36-23.6	0.19	0.35	ND	ND-1.06
2-OH-Flu	11.1	9.45	8.02	4.41-36.0	0.46	0.53	0.28	0.13-1.91	17.2	10.8	17.0	4.01-33.9	0.63	0.55	0.37	0.09-1.64
2-OH-Phe	2.93	1.84	1.94	1.32-6.84	0.10	0.19	0.02	ND-0.61	6.14	4.42	4.55	1.68-15.4	0.14	0.19	0.06	ND-0.54
3-OH-Phe	3.89	2.53	2.98	1.66-9.34	0.12	0.21	0.02	ND-0.62	7.67	5.32	6.10	2.01-16.6	0.19	0.22	0.13	ND-0.64
1/9-OH-Phe	2.27	2.84	1.41	0.45-9.98	0.04	0.07	0.02	0.02-0.23	3.61	3.49	2.49	0.47-11.9	0.02	0.00	0.02	0.02-0.03
4-OH-Phe	1.56	1.82	0.95	0.31-6.43	0.27	0.23	0.17	0.15-0.92	2.04	1.91	1.43	0.56-6.91	0.14	0.06	0.15	ND-0.21
1-OH-Pyr	1.86	2.09	0.84	0.09-5.56	0.11	0.08	0.09	ND-0.33	2.84	2.15	2.28	0.68-7.21	0.94	1.65	ND	ND-5.10
Σ ₁₀ OH-PAHs	171	128	133	65.1-500	10.3	10.5	7.87	2.04-37.7	178	87.3	168	50.7-346	9.13	6.84	7.03	2.33-20.0

SD: standard deviation.

ND: not detected.

Table S8 Spearman correlation coefficients between different classes of compound concentrations and lipid content

Internal (n=20)								External (n=20)						
	2-rings	3-rings	4-rings	5-rings	6-rings	Σ16 PAHs	Lipid		2-rings	3-rings	4-rings	5-rings	6-rings	Σ16 PAHs
Tri-BDEs	0.611**	--	--	0.481*	--	--	--	Tri-BDEs	--	--	--	--	--	--
Tetra-BDEs	0.696**	0.702**	0.577**	0.574**	0.505*	0.568**	0.589**	Tetra-BDEs	--	--	--	--	--	--
Penta-BDEs	0.756**	0.689**	0.498*	0.565**	0.483*	0.522*	0.651**	Penta-BDEs	--	--	--	--	--	--
Hexa-BDEs	0.794**	0.664**	0.464*	0.580**	0.479*	0.516*	0.660**	Hexa-BDEs	--	--	--	--	--	--
Hepta-BDEs	0.735**	0.591**	0.391	0.559*	--	0.472*	0.691**	Hepta-BDEs	--	--	--	--	--	--
Octa-BDEs	0.747**	0.737**	0.499*	0.644**	0.527*	0.574**	0.781**	Octa-BDEs	--	--	--	0.447*	--	--
Nona-BDEs	0.764**	0.680**	0.505*	0.573**	0.447*	0.529*	0.800**	Nona-BDEs	--	--	--	--	--	--
Deca-BDEs	0.786**	0.683**	0.465*	0.516*	--	0.490*	0.803**	Deca-BDEs	--	--	--	--	--	--
Σ ₂₀ PBDEs	0.786**	0.687**	0.534*	0.567**	0.475*	0.547*	0.715**	Σ ₂₀ PBDEs	--	--	--	--	--	--
Lipid	0.663**	0.557*	0.529*	0.549*	0.476*	0.575**	1							

--. No significant correlation.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table S9 Spearman correlation coefficients between OH-PAHs and the two parent compounds

	Internal (n=20)					External (n=20)					
	OH-Nap	OH-Flu	OH-Phe	OH-Pry	ΣOH-PAHs	OH-Nap	OH-Flu	OH-Phe	OH-Pry	ΣOH-PAHs	
Tri-BDEs	—	—	0.465*	—	—	Tri-BDEs	—	—	—	—	
Tetra-BDEs	—	0.547*	0.570**	—	—	Tetra-BDEs	—	—	—	—	
Penta-BDEs	—	0.445*	0.504*	—	—	Penta-BDEs	—	—	—	—	
Hexa-BDEs	—	0.463*	0.545*	0.493*	—	Hexa-BDEs	—	—	—	—	
Hepta-BDEs	—	—	0.487*	0.495*	—	Hepta-BDEs	—	—	—	—	
Octa-BDEs	—	—	—	—	—	Octa-BDEs	—	—	—	—	
Nona-BDEs	—	0.460*	0.570**	—	—	Nona-BDEs	—	—	—	—	
Deca-BDEs	—	0.481*	0.571**	0.449*	—	Deca-BDEs	—	—	—	—	
Σ ₂₀ PBDEs	—	—	0.564**	0.461*	—	Σ ₂₀ PBDEs	—	—	—	—	
2-rings	—	—	—	—	—	2-rings	0.450*	0.563**	0.555*	--	0.496*
3-rings	0.474*	0.612**	0.672**	0.571**	0.632**	3-rings	0.782**	0.671**	0.761**	0.606**	0.806**
4-rings	—	0.592**	0.818**	0.738**	0.598**	4-rings	0.586**	0.560*	0.810**	0.513*	0.636**
5-rings	—	0.462*	0.737**	0.723**	0.454*	5-rings	—	—	0.593**	—	—
6-rings	—	0.446*	0.707**	0.670**	0.514*	6-rings	—	—	0.660**	—	—
Σ ₁₆ PAHs	—	0.586**	0.811**	0.774**	0.583**	Σ ₁₆ PAHs	0.626**	0.599**	0.834**	0.512*	0.674**
lipid	—	—	—	—	—						

--. No significant correlation.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

