

Supplementary Materials

**Dechlorane Plus in air, dust, handwipes, and hair at a typical e-waste site in
South China: Implications for human exposure**

Instrumental analysis

DP and its dechlorinated products were analyzed by a gas chromatography-mass spectrometry. Chromatographic separation was achieved on a DB-5HT capillary column (15 m × 0.25 mm i.d., 0.1 μm film thickness; J&W Scientific) with helium carrier gas at a constant flow rate of 1.0 mL/min. A 1 μL sample was injected in splitless mode with the injector temperature maintained at 280°C. The oven temperature program was initiated at 110°C (2 min hold), ramped at 20°C/min to 280°C (3 min hold), then increased at 30°C/min to 310°C (16 min hold) to ensure complete elution of highly chlorinated compounds. Methane was used as the moderating gas with an ion source pressure of 2.4×10^3 Pa, while the ion source, quadrupole, and interface temperatures were set to 200°C, 150°C, and 280°C, respectively. Selected ion monitoring (SIM) targeted the characteristic ions at m/z 653.8/651.8 for DP isomers and m/z 618.0/620.0 for *anti*-Cl₁₁-DP.

QA/QC

The regression coefficients of the calibration curve for all DPs and the dechlorination products were above 0.999. Analyte recoveries were between 80 % and 120 %. A procedural blank and a reagent blank were analyzed to check potential contamination in the laboratory, and no DP was detected in the blank samples. Throughout the instrumental analysis, the stability of the detector response was assessed by analyzing a 100 μg/L mixed internal standard solution with a relative standard deviation below 10%. Duplicate samples were performed for each batch with

a relative phase deviation of less than 10%. The limit of detection (LOD) was defined as three times the signal-to-noise (S/N) ratio.

Table S1 Levels of DPs in various matrices

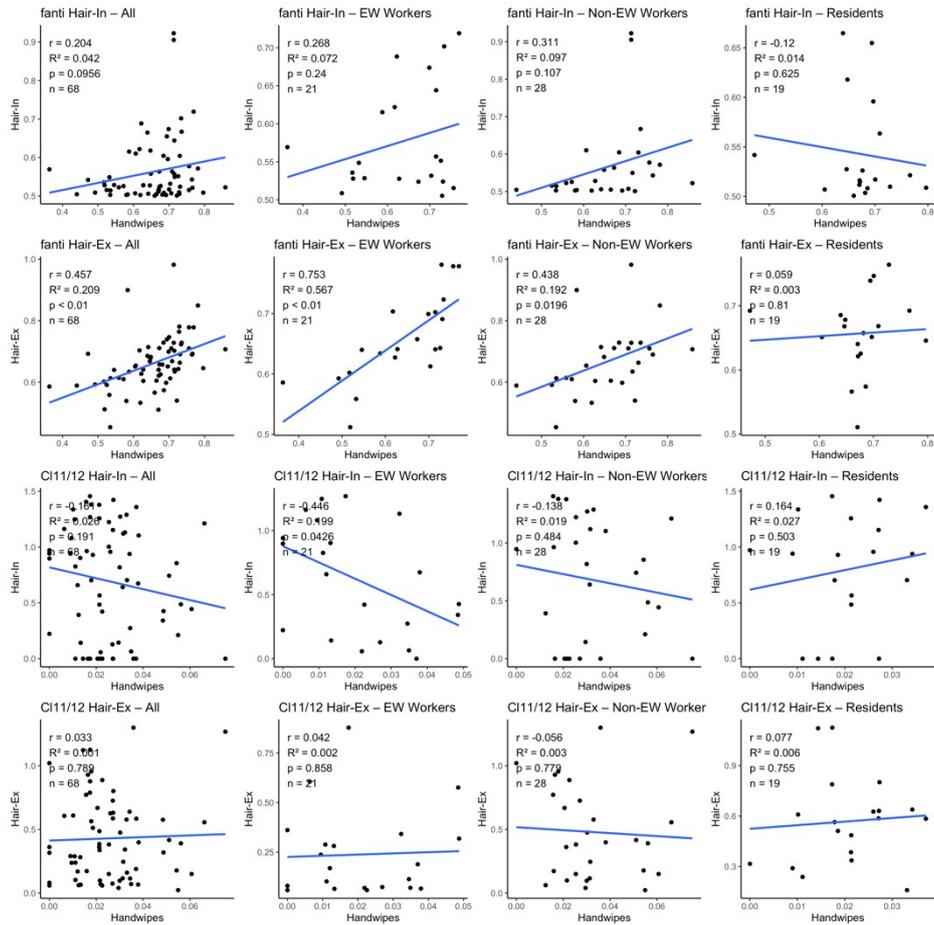
Sample matrix	Sampling location	syn-DP	anti-DP	Total DP	f_{anti}	Cl ₁₁ -DP	Reference
Serum (ng/g)	Residents living in an e-waste dismantling region, China	17.1	21.2	42.6	0.53	-	(1)
	Residents near the e-waste dismantling area, China	5.1	8.6	13.7	0.64	-	
	Workers engaged in the DP manufacturing process	386	471	857	0.54	-	
	Workers without direct DP contact, China	143	207	350	0.6	-	(2)
	Residents near a DP manufacturing plant, China	106	207	243	0.61	-	
	E-waste recycling workers, China	77	120	190	0.65	-	(3)
	>20-year residents living in an e-waste recycling region, China	2.79	5.95	8.64	0.7	-	(4)
	<3-year residents living in an e-waste recycling region, China	0.96	2.71	4.02	0.75	-	
	General population, China	0.58	3.56	4.27	0.86	-	(5)
	Control	ND	4.63	4.63	0.6	ND	(6)
	E-waste dismantling workers	52.7	103.6	153	0.66	1.47	
Hair (ng/g)	Volunteer participants in Sun Yat-sen University located in Guangzhou	ND	ND	ND	ND	-	(7)
	E-waste recycling workers	23	24	46	0.47	0.19	(3)
	E-waste recycling workshop	6.86	8.52	15.4	0.55	0.06	
	Resident area in e-waste recycling area	2.48	3.6	6.08	0.62	0.03	(8)
	Rural control area	0.19	0.84	1.03	0.76	ND	
	Urban control area	0.22	0.65	0.87	0.74	ND	
	Worker having direct contact with DP	279	158	260	0.56	-	
	Workers without direct contact with DP	102	158	260	0.59	-	(2)
	Control	28.5	53.3	81.7	0.6	-	
	Female e-waste dismantling workers	10.6	12.1	23.5	-	-	(9)
	EW workers	0.944	1.31	2.48	0.549	1.47	
Non-EW workers	0.490	0.572	1.09	0.524	1.33	this study	
Adult residents	0.492	0.522	1.000	0.517	1.36		
Handwipes (ng/per sample)	Adult residents in Guangzhou	0.04	0.14	0.2	-	-	(10)
	Adults' pums	0.2	0.4	0.7	-	-	
	Adults' back-of-hands	0.2	0.3	0.5	-	-	(11)
	Adults' forearms	0.1	0.3	0.4	-	-	
	EW workers	7.41	16.9	23.2	0.673	0.571	
	Non-EW workers	2.390	5.36	8.19	0.669	0.247	this study
	Adult residents	1.84	4.55	6.560	0.676	0.111	

Table S1 Levels of DPs in various matrices. Continued.

Sample matrix	Sampling location	syn-DP	anti-DP	Total DP	f_{anti}	Cl ₁₁ -DP	Reference					
Dust (ng/g)	E-waste recycling workshop	723	793	1515	0.54	8.78	(8)					
	Resident area in e-waste recycling area	101	276	377	0.66	2.71						
	Rural control area	15.6	49.3	64.9	0.76	nd-2.6						
	Urban control area	4.62	14.3	18.9	0.7	nd						
	Adult residents in Guangzhou		5.3	19.4	24.5	-	-	(10)				
	E-waste area	212	325	541	-	-	(12)					
	Guangzhou area	2.98	12.4	13.8								
	Rural control area	0.971	2.49	3.95								
	Indoor dust in city of Ottawa in 2003			14	-	-	(13)					
	Indoor dust in city of Ottawa in 2007			22								
	Workshop		40	130	170	-	-	(14)				
	Guiyu middle school		26.5	280	375							
	Yujiao village		290	840	1100							
	Nanan village		3.6	11	15							
Living area		5.5	17	23								
Dismantling Area		959	3190	4150	0.766	73.2	this study					
Office Area		14.8	46.5	61.3	0.759	0.25						
Residential Area		0.398	0.833	1.23	0.677	ND						
Longyearbyen, Svalbard.(n=34)		0.22	0.55	0.76	-	-	(15)					
Air (pg/m ³)	Urban spring Czech Republic	279	174	-	-	-	(16)					
	Urban summer	50.3	69.6									
	Urban autumn	242	232									
	Urban winter	186	161									
	Rural spring	366	267									
	Rural summer	113	68.9									
	Rural autumn	213	197									
	Rural winter	157	140									
	Bihar, India (n = 15; 8 urban, 7 sub-urban).		2.14					0.38	2.52	-	-	(17)
	Sapporo(n=14)		1.40					4.07	5.46	0.69	-	(18)
	Sagamihara(n=14)		11.2					3.00	4.112	0.71		
	Kanazawa(n=14)		0.61					1.76	2.37	0.73		
	Kitakyushu(n=14)		1.22					2.39	3.61	0.72		
	Busan(n=14)		0.335					0.54	0.88	0.63		
Beijing(n=14)		0.585	0.40	1.98	0.68							
DP production plant		-	-	12193	-	-	(19)					
Dismantling Area		1970	2720	4830	0.600	385	this study					
Office Area		49.1	73.9	123	0.711	13.8						
Residential Area		4.18	12.9	17.0	0.749	ND						

Table S2 Participant-stratified correlations between concentrations of DP.

Participant Category	Sample Pair	R²	p-value
EW workers	Hair-In vs Handwipes	0.008	0.703
	Hair-Ex vs Handwipes	0.056	0.301
Non-EW workers	Hair-In vs Handwipes	0.136	0.053
	Hair-Ex vs Handwipes	0.243	<0.05
Residents	Hair-In vs Handwipes	0.010	0.679
	Hair-Ex vs Handwipes	0.001	0.89



FigureS1 Correlations between f_{anti} and C_{11}/C_{12}

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