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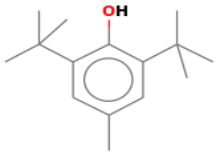
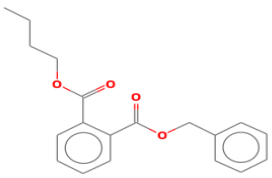
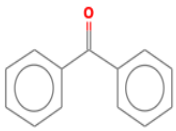
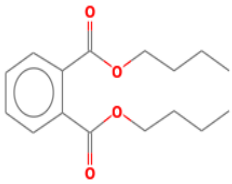
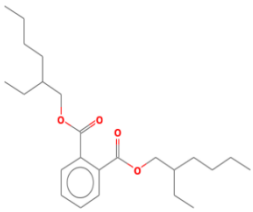
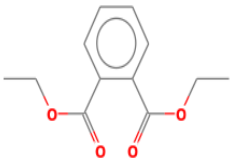
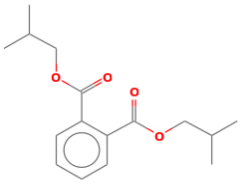
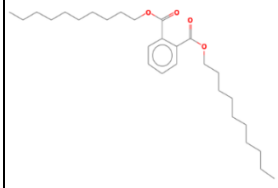
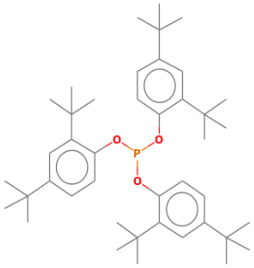
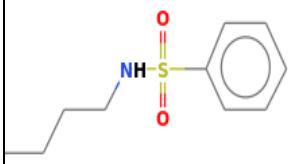
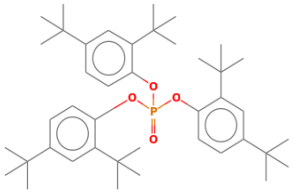
Supplementary table 1: Chemical structures and physicochemical properties of the target compounds

	Target compound	Chemical structure	Boiling point (°C)	Molecular weight (g/mol)
1	Butylated hydroxytoluene CAS 128-37-0		265	220.3
2	Benzylbutyl phthalate CAS 85-68-7		408	312.3
3	Benzophenone CAS 119-61-9		305	182.2
4	Dibutyl phthalate CAS 84-74-2		340	278.3
5	Diethylhexyl phthalate CAS 117-81-7		385	390.6

	Target compound	Chemical structure	Boiling point (°C)	Molecular weight (g/mol)
6	Diethyl phthalate CAS 84-66-2		295	222.2
7	Diisobutyl phthalate CAS 84-69-5		296	278.3
8	Didecyl phthalate CAS 84-77-5		261	446.7
9	Irgafos 168 (Tris (2,4-di-tert-butylphenyl) phosphite) CAS 31570-04-4		594	646.9
10	N-butylbenzene sulphonamide CAS 3622-84-2		314	213.3
11	Tris (2,4-di-tert-butylphenyl) phosphate CAS 95906-11-9		609	662.9

Supplementary table 2: Sample overview

HOUSEHOLD WASTE 1


A1


A2


A3


A4


A5


A6


A7


A8


A9


A10


B1

HOUSEHOLD WASTE 2


B2


B5


B6


B7


B8


B9


B10


B11

RECYCLING FACILITY 1


C1

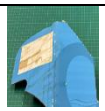

C2


C3


C4


D1


D2


D3


D4


E1


E3


E4


E5


E6


E7


E8


E9


E10


F1


F2


G1


G3

RETAIL 1 & 2

H2

H4

H5

H3

H6

J1

J2

J3

SOLID WASTE 1

K1

K2

L2

L3

M1

M2

M3

N1

N3

WASTE PICKER 1

O1

O2

O3

O4

MILLS


P1


P2


P3


P4


P5

CORRUGATORS


Q1


Q2


Q3


Q4

RETAIL 3 & 4

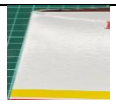

R1


R2


R3


S1


S2


S3


S4


S5

WASTE PICKERS 2 & 3


T1


T2


T3


U1


U2


U3

RECYCLING FACILITY 2


V1


V2


V3


W1


W2


W3


X1


X2


X3


Y1


Y2

RETAIL 5


Z1


Z2


Z3

SOLID WASTE 2


AA1


BB1


BB2

CC1

DD1

DD2

DD3

EE1

EE2

EE3

Supplementary table 3: Performance of the analytical method for multi-residue analysis of semi-volatile pollutants in recycling paper grades

Compound	Retention time (min)	SIM ion (m/z)	R^2	LOD (ηg/g paper)	LOQ (ηg/g paper)	Recovery ± %RSD					
						Paperboard (mg/kg)			Paper (mg/kg)		
d-DBP	27.12	153				**0.12**	**0.2**	**3**	**0.12**	**0.2**	**3**
BBP	30.22	149	0.9906	3.620	12.069	99±2.0	100±5.7	98±3.1	99±3.4	100±2.2	100±1.6
BHT	20.98	205	0.9966	2.050	6.832	73±4.2	83±5.3	91±3.4	82±2.0	90±5.6	98±2.33
BP	23.05	105	0.9904	4.488	14.962	84±4.4	93±1.5	96±3.2	87±6.7	98±5.3	97±2.4
DBP	27.14	149	0.9957	2.974	9.914	99±5.4	99±2.6	98±1.0	99±1.8	100±1.3	100±2.7
DEHP	33.58	149	0.9943	1.538	5.128	98±2.5	97±2.2	101± 3.4	101±2.9	100±1.9	100±1.5
DEP	22.41	149	0.9923	3.301	11.004	92±1.8	98±4.6	95±7.7	94±7.1	97±1.6	99±3.03
DIBP	25.98	149	0.9962	1.987	6.662	99±2.4	97±2.9	99±1.3	99±8.4	99±2.1	99±3.1
DIDP	39.21	149	0.9913	1.064	3.547	100±3.7	99±6.9	98±5.4	100±2.2	99±6.7	100±1.6
AO168	41.10	441	0.9979	0.944	3.147	99±2.1	98±1.9	98±1.8	99±3.7	100±2.0	87±1.9
NBBS	25.97	77	0.9992	0.964	3.212	100±2.7	100±1.6	104±5.4	98±2.85	99±3.9	99±3.5
AO168O	43.67	57	0.9927	1.161	3.872	98±2.4	100±5.7	99±1.5	99±3.3	101±1.7	100±2.0

Supplementary table 4: Detected concentrations ± %RSD (mg/kg paper)

#		DBP	DIBP	DEHP	BBP	DEP	DIDP	BHT	BP	NBBS	AO168	AO168O	DIPN
1	A1	0.10±5.85	ND	37.12±6.72	ND	<LOQ	ND	ND	0.16±4.15	0.60±3.70	ND	ND	
2	A2	0.26±5.01	0.11±2.24	0.61±16.68	0.15±3.02	0.10±10.13	ND	0.11±36.46	0.14±18.96	ND	ND	ND	0.07±19.39
3	A3	ND	0.06±1.35	0.57±5.29	ND	0.01±24.45	0.73±12.81	ND	ND	ND	ND	ND	ND
4	A4	0.74±1.04	0.08±4.97	2.71±4.98	0.15±8.03	0.09±3.84	0.14±11.03	0.03±1.77	0.38±3.06	ND	ND	ND	0.15±3.10
5	A5	ND	0.06±6.70	0.62±9.20	0.51±11.15	<LOQ	0.13±10.61	ND	ND	ND	ND	ND	
6	A6	0.41±25.18	0.30±2.85	3.43±0.91	ND	0.10±11.04	ND	ND	0.20±6.22	ND	ND	ND	0.04±12.49
7	A7	0.75±7.20	0.14±11.98	1.61±8.30	ND	0.07±24.76	ND	ND	0.16±10.50	ND	ND	ND	ND
8	A8	2.55±6.25	0.07±1.27	0.35±2.02	16.84±9.39	0.61±12.53	ND	ND	ND	ND	ND	ND	ND
9	A9	1.60±0.31	0.36±2.14	12.43±6.83	ND	0.21±8.62	0.88±3.15	ND	ND	ND	ND	ND	0.03±6.82
10	A10	ND	ND	0.30±4.13	ND	0.88±6.25	ND	ND	ND	ND	ND	ND	ND
11	B1	3.47±4.63	0.24±1.26	3.38±3.25	ND	0.04±6.28	0.03±22.13	ND	1.71±8.57	ND	ND	ND	0.03±32.19
12	B2	ND	0.03±5.70	1.89±1.18	ND	0.07±24.76	ND	ND	0.16±10.50	ND	ND	ND	ND
13	B5	1.30±2.06	ND	1.40±1.99	ND	0.10±1.64	ND	ND	0.03±21.82	ND	ND	ND	0.08±4.41
14	B6	0.34±20.71	0.06±15.45	3.59±3.19	ND	0.01±24.05	ND	ND	ND	ND	ND	ND	ND
15	B7	ND	ND	5.12±27.32	4.80±37.19	0.03±21.59	ND	ND	0.72±7.25	1.08±23.90	ND	1.41±18.96	0.11±14.09
16	B8	0.08±3.70	0.07±5.13	1.18±12.34	ND	0.01±22.67	ND	0.05±41.32	1.77±28.41	ND	0.55±21.08	ND	ND
17	B9	ND	0.04±4.58	2.92±11.71	0.36±1.28	0.03±53.94	ND	0.04±6.01	7.69±4.23	0.05±2.39	ND	0.25±24.69	ND
18	B10	55.64±5.68	1.99±13.57	15.04±10.34	0.60±4.28	0.64±9.20	2.80±7.27	ND	3.43±9.20	ND	ND	ND	0.58±18.27
19	B11	2.65±1.14	2.10±1.86	8.51±3.67	ND	ND	ND	ND	0.18±15.99	ND	ND	ND	0.03±16.66
20	C1	ND	0.03±9.38	0.93±4.17	0.42±32.84	<LOQ	0.13±31.14	0.13±24.45	0.17±12.10	0.74±41.93	ND	0.36±38.06	ND
21	C2	2.27±3.11	0.16±14.46	2.06±17.81	ND	ND	ND	0.05±30.82	ND	ND	0.27±11.82	1.83±2.00	1.36±6.34
22	C3	ND	0.05±4.09	2.08±5.60	ND	ND	ND	ND	ND	0.57±12.66	ND	ND	ND
23	C4	ND	ND	9.11±12.21	ND	ND	ND	0.05±14.71	ND	0.49±15.22	ND	0.31±7.26	ND
24	D1	0.43±19.17	0.06±5.83	0.33±20.07	<LOQ	ND	ND	ND	0.46±19.97	ND	ND	0.04±5.73	ND
25	D2	ND	ND	1.67±19.14	ND	ND	ND	ND	24.71±0.57	ND	ND	ND	0.15±17.01
26	D3	1.24±2.31	0.10±2.25	2.58±3.44	0.61±16.93	ND	0.27±11.04	ND	ND	0.37±6.25	ND	ND	
27	D4	2.23±2.80	0.23±2.14	4.03±5.72	0.17±11.87	0.03±3.65	0.50±13.69	ND	4.53±9.64	ND	ND	0.71±7.58	0.04±1.17
28	E1	4.91±9.28	0.11±5.75	9.01±0.56	ND	ND	0.18±0.19	ND	0.91±6.38	ND	ND	1.76±3.99	0.08±3.55
29	E3	6.91±27.09	0.18±7.18	3.82±4.88	0.02±23.65	0.03±27.76	0.08±30.58	ND	0.60±13.70	0.04±1.86	ND	ND	1.03±10.94
30	E4	2.37±4.65	0.39±4.57	10.39±21.23	ND	0.11±18.22	ND	<LOQ	0.41±18.11	0.56±9.24	ND	0.62±15.19	0.14±7.99
31	E5	2.93±17.39	ND	ND	ND	ND	ND	ND	3.30±30.11	ND	ND	ND	0.02±38.26
32	E6	2.58±4.95	0.05±2.68	2.28±21.51	0.62±2.69	ND	ND	ND	0.37±3.40	0.57±46.62	ND	3.05±45.23	0.07±11.19
33	E7	0.66±5.86	0.57±27.10	13.90±16.59	ND	ND	ND	ND	ND	0.69±2.21	ND	1.20±15.00	ND
34	E8	2.51±2.64	0.14±18.00	1.22±4.64	ND	0.01±34.41	ND	ND	0.61±5.09	ND	ND	ND	0.11±24.13
35	E9	2.95±13.77	0.15±15.68	3.66±4.52	0.08±32.18	0.01±92.59	ND	0.03±2.56	ND	0.59±34.63	ND	0.16±9.29	0.58±7.50
36	E10	ND	0.06±20.75	2.80±15.67	ND	ND	ND	ND	0.43±25.24	0.95±27.82	ND	ND	ND

#		DBP	DIBP	DEHP	BBP	DEP	DIDP	BHT	BP	NBBS	AO168	AO168O	DIPN
37	F1	5.42±0.55	0.39±8.22	2.96±22.45	ND	ND	ND	ND	0.12±7.77	0.74±20.61	1.10±0.06	0.59±23.17	ND
38	F2	ND	0.10±1.84	5.63± 9.45	ND	0.01±39.15	0.54±19.75	0.03±2.44	0.19±6.42	0.77±6.52	1.09±0.02	0.78±5.20	ND
39	G1	ND	ND	1.14±9.56	ND	0.01±19.79	1.14±9.56	0.03±1.28	14.16±7.50	0.59±11.68	ND	0.07±3.97	0.19±9.70
40	G3	ND	0.16±1.39	7.40±15.31	ND	ND	ND	ND	2.05±9.90	1.59±24.79	ND	ND	0.03±1.32
41	H2	0.65±19.42	0.14±21.66	5.63±18.46	ND	ND	ND	ND	0.09±19.11	0.88±16.66	ND	0.34±15.83	ND
42	H4	4.76±15.36	0.22±31.69	3.94±11.28	ND	ND	ND	ND	ND	ND	ND	ND	0.06±30.92
43	H5	ND	0.05±0.70	0.24±0.92	ND	ND	ND	0.09±2.29	ND	ND	ND	ND	ND
44	H3	ND	0.08±4.13	3.27±4.25	3.11±1.75	<LOQ	2.88±8.73	0.08±3.23	ND	0.39± 8.3	<LOQ	0.19±6.50	ND
45	H6	ND	0.15±18.08	1.20±3.33	ND	ND	ND	0.52±21.37	ND	ND	ND	ND	ND
46	J1	2.50±4.33	0.98±10.15	34.80±21.90	ND	0.89±20.97	ND	ND	0.70±26.34	ND	ND	ND	ND
47	J2	2.04±12.42		28.14± 5.69	2.16±17.32	0.05±29.93	ND	ND	0.80±23.70	2.48±9.58	ND	ND	ND
48	J3	1.94±13.73	0.92±25.37	1.84±40.20	<LOQ	0.56±34.06	1.18±31.11	0.05±21.42	22.02±24.02	0.52±22.25	ND	ND	0.04±30.35
49	K1	28.74±17.03	0.08±9.68	2.53±21.42	0.39±14.49	ND	ND	ND	0.21±15.53	0.31±39.58	ND	ND	0.01±16.12
50	K2	ND	ND	ND	ND	ND	ND	ND	0.58±11.30	0.52±9.19	ND	ND	0.02±9.67
51	L2	ND	ND	12.00±10.62	0.03±18.66	ND	ND	0.02±1.33	2.34±13.74	0.06±9.70	ND	ND	ND
52	L3	ND	0.20±12.98	4.53±26.14	ND	ND	ND	ND	2.58±12.54	0.42±18.77	ND	ND	ND
53	M1	0.52±5.81	0.19±6.45	5.13±1.55	ND	ND	ND	ND	ND	ND	<LOQ	0.06±12.27	ND
54	M2	0.53±11.46	0.11±5.77	36.13±2.89	ND	ND	ND	ND	ND	ND	ND	ND	ND
55	M3	1.82±3.80	0.12±4.51	0.08±7.40	ND	0.02±5.03	ND	ND	0.15±5.00	ND	ND	ND	ND
56	N1	ND	0.07±19.92	ND	2.12±9.71	0.04±14.90	ND	0.05±18.87	ND	0.12±2.87	ND	ND	ND
57	N3	ND	0.06±9.83	1.13±21.61	2.49±5.45		ND	ND	ND	0.12±12.72	ND	ND	ND
58	O1	ND	0.24±0.62	1.53±3.41	<LOQ	<LOQ	ND	ND	ND	ND	ND	ND	0.13±3.98
59	O2	0.34±4.17	0.42±9.98	0.65±3.51	0.16±23.75	0.05±22.03	ND	0.13±1.32	0.69±2.05	ND	ND	ND	0.05±5.96
60	O3	0.68±4.35	0.08±5.27	1.07±16.12	ND	ND	ND	ND	ND	ND	ND	0.06±3.91	0.03±5.33
61	O4	0.48±2.56	0.29±8.72	4.56±13.86	0.12±7.30	<LOQ	1.31±8.76	ND	0.33±15.36	ND	ND	0.04±20.25	0.36±2.18
62	P1	2.16±1.86	0.12±12.83	1.93±1.56	ND	ND	ND	ND	0.27±5.92	ND	ND	ND	0.05±2.09
63	P2	0.59±3.63	0.07±3.28	1.35±7.46	ND	<LOQ	ND	<LOQ	ND	ND	ND	ND	0.21±3.45
64	P3	ND	0.04±0.39	0.69±11.71	ND	ND	ND	ND	ND	ND	ND	ND	0.02±1.07
65	P4	0.16±3.19	ND	0.15±1.03	ND	ND	ND	ND	ND	ND	ND	ND	ND
66	P5	4.21±8.31	0.22±5.75	2.86±10.54	0.07±4.59	0.01±15.02	<LOQ	ND	0.26±2.79	ND	ND	ND	ND
67	Q1	0.25±7.92	0.04±5.15	0.52±4.77	ND	ND	ND	ND	ND	ND	ND	ND	ND
68	Q2	0.95±5.31	0.08±3.18	1.22±3.64	0.01±16.81	ND	0.18±3.93	ND	ND	ND	ND	ND	ND
69	Q3	ND	0.12±5.49	2.29±3.57	0.38±4.21	ND	0.62±6.59	ND	ND	ND	ND	ND	ND
70	Q4	1.59±8.16	ND	2.58±8.88	ND	ND	ND	ND	ND	ND	ND	ND	0.20±23.67
71	R1	ND	0.06±5.41	0.40±12.76	ND	0.06±29.89	ND	ND	0.32±8.55	ND	ND	ND	ND
72	R2	0.34±2.00	0.33±2.49	ND	ND	0.28±2.19	ND	0.04±0.49	0.64±1.66	ND	1.09±0.02	0.63±2.88	0.18±2.27
73	R3	ND	ND	ND	ND	ND	ND	ND	1.34±9.38	ND	ND	ND	ND
74	S1	0.28±1.42	2.14±3.70	3.89±6.87	0.04±32.20	0.01±18.12	ND	ND	0.61±2.16	ND	ND	ND	0.10±3.75

#		DBP	DIBP	DEHP	BBP	DEP	DIDP	BHT	BP	NBBS	AO168	AO168O	DIPN
75	S2	0.26±5.14	0.17±6.86	3.63±3.22	0.93±51.92	0.01±26.15	ND	0.03±0.81	0.86±6.12	ND	ND	ND	0.89±7.36
76	S3	0.82±0.56	0.14±1.84	2.21±2.07	0.26±10.65	ND	ND	ND	0.61±11.29	ND	ND	ND	0.23±5.74
77	S4	7.19±14.07	0.10±2.34	1.23±0.75	ND	ND	ND	ND	ND	ND	ND	ND	0.29±2.63
78	S5	0.34±3.77	0.08±8.09	4.46±19.03	ND	0.01±16.63	ND	ND	0.45±5.59	ND	ND	0.08±9.09	0.62±19.22
79	T1	0.46±9.13	0.06±7.15	3.92±15.34	ND	ND	ND	0.03±0.27	ND	ND	ND	ND	ND
80	T2	2.19±8.50	0.16±18.30	8.73±9.71	0.30±4.37	<LOQ	ND	ND	ND	ND	ND	ND	0.17±3.87
81	T3	6.15±3.06	2.68±3.85	1.40±5.02	0.12±11.85	ND	0.24±11.36	ND	ND	ND	ND	ND	ND
82	U1	0.48±5.79	0.10±5.02	0.41±10.38	ND	ND	ND	ND	0.27±5.41	ND	ND	ND	ND
83	U2	3.62±2.19	0.19±4.44	2.96±2.67	0.07±7.82	ND	ND	ND	0.36±1.49	ND	ND	ND	0.05±18.88
84	U3	3.58±4.02	0.18±5.17	2.14±5.52	ND	ND	0.57±6.39	ND	0.54±5.45	ND	ND	ND	0.08±6.57
85	V1	0.13±4.47	0.07±7.74	0.61±10.15	0.42±46.62	<LOQ	ND	0.05±2.77	0.25±9.01	ND	ND	ND	0.01±9.44
86	V2	ND	0.09±24.57	0.56±5.79	0.10±5.93	ND	0.17±5.42	9.41±26.94	ND	ND	ND	ND	0.04±4.60
87	V3	ND	0.39±4.35	9.50±4.95	1.39±2.32	0.10±1.23	ND	0.05±2.77	0.25±9.01	ND	ND	ND	0.01±9.44
88	W1	0.33±19.28	0.18±5.63	2.49±4.08	0.47±44.20	<LOQ	ND	ND	0.52±0.58	ND	ND	ND	0.21±12.99
89	W2	ND	0.78±1.61	ND	0.17±4.75	3.81±25.35	ND	0.03±2.86	ND	ND	ND	1.07±1.31	
90	W3	0.74±5.82	0.07±7.66	0.62±1.31	ND	0.02±1.55	ND	ND	ND	ND	1.09±0.11	0.07±1.94	
91	X1	1.36±10.11	0.09±4.99	ND	0.16±20.90	ND	ND	ND	ND	ND	ND	0.22±36.09	0.22±4.23
92	X2	0.23±6.26	0.07±2.46	0.35±9.65	ND	ND	ND	0.11±19.35	0.38±13.05	ND	<LOQ	0.59±26.98	0.02±25.51
93	X3	0.03±6.85	0.15±67.80	3.96±17.41	0.46±8.37	<LOQ	7.99±17.78	ND	0.48±5.58	ND	ND	0.15±20.25	0.11±7.65
94	Y1	0.09±0.84	0.06±50.19	0.11±0.38	ND	ND	ND	ND	ND	ND	ND	ND	ND
95	Y2	0.16±5.54	0.18±38.47	0.26±2.08	ND	ND	ND	ND	ND	ND	ND	ND	ND
96	Z1	0.27± 6.05	0.05±5.45	0.02±21.76	ND	ND	0.02±21.76	ND	ND	ND	ND	ND	ND
97	Z2	11.08±28.61	ND	ND	ND	ND	ND	ND	ND	ND	0.58±20.79	ND	ND
98	Z3	ND	0.16±0.24	0.42±7.57	ND	<LOQ	ND	ND	ND	ND	0.36±15.38	ND	ND
99	AA1	ND	0.06±8.28	1.09±1.98	0.56±9.74	ND	ND	0.04±10.88	0.61±3.53	ND	ND	ND	ND
100	BB1	0.86±9.34	0.33±8.07	2.70±9.54	ND	ND	ND	ND	ND	ND	ND	ND	ND
101	BB2	0.16±14.53	0.14±12.90	0.66±15.50	ND	ND	ND	0.03±0.45	0.17±2.51	ND	1.09±0.02	ND	ND
102	CC1	0.07±1.95	0.12±2.27	0.24±1.51	0.21±0.47	ND	0.20±7.41	0.03±0.27	ND	ND	1.10±0.01	ND	ND
103	DD1	0.12±2.09	0.07±2.54	1.19± 2.81	ND	ND	ND	ND	0.49±2.44	ND	ND	ND	0.06±1.88
104	DD2	ND	ND	2.59±11.23	1.45±4.03	ND	ND	0.06±4.56	ND	ND	ND	ND	ND
105	DD3	ND	0.05±5.84	1.17±7.89	ND	ND	ND	0.05±55.42	ND	ND	ND	ND	ND
106	EE1	0.31±0.94	0.09±2.31	0.59±0.04	<LOQ	ND	ND	ND	0.08±2.00	ND	<LOQ	ND	ND
107	EE2	0.75±1.82	0.10±3.14	0.78±4.14	ND	0.01±7.17	ND	ND	0.65±1.42	ND	ND	ND	0.02±9.46
108	EE3	ND	0.08±31.61	0.82±3.56	0.36±7.66	0.01±3.27	0.02±29.23	ND	0.61±11.22	ND	ND	ND	

Supplementary table 5: Roles of interview participants

#	Role
1	Formal sorter
2	Recycled materials specialist
3	Recycling middleman
4	Small business owner
5	Waste picker
6	Waste picker
7	Waste picker
8	Waste picker
9	Industry watchdog
10	Recycling research analyst
11	Recycling manager
12	Formal sorter
13	Recycling facility manager
14	Formal collector
15	Formal suburban recycling collector
16	Recycling site supervisor

Supplementary table 6: Responses to: What is your understanding of the different paper grades used for recycling?

Participant	Known paper grades	Number of grades identified
1	Newsprint, K4, white, SBM, special news, FN, HL1, HL2, CMW	9
2	Newsprint, K4, K3, SBM, HL1, HL2, CMW, sacks and bags	8
3	Newspaper, cardboard, magazine, paper	4
4	Cardboard	1
5	Newspaper, boxes, magazine, white paper	4
6	News, magazine, white paper, common paper	4
7	Newspaper, cardboard, magazine, white paper, common paper	5
8	Not sure, newspaper, cardboard	2
9	K4 highest recycling, HL1 toilet paper, newspaper, CMW, FN, SN	6
10	In South Africa, grouped according to end product, SN, K3, K4, HL1, HL2, CMW	6
11	Newspaper, K4, K3, SBM, HL1, HL2, CMW	7
12	Newspaper, catalogues, boxes, office paper, potato sacks, common waste	6
13	K4, white, CMW, special news, flat news	5
14	Mainly cardboard, white paper, office paper, magazine	5
15	Newspaper, magazine, office, white paper, cardboard, mixed	6
16	Newspaper, white, CMW, IMW, K4, HL	6
	Average	**5.25**

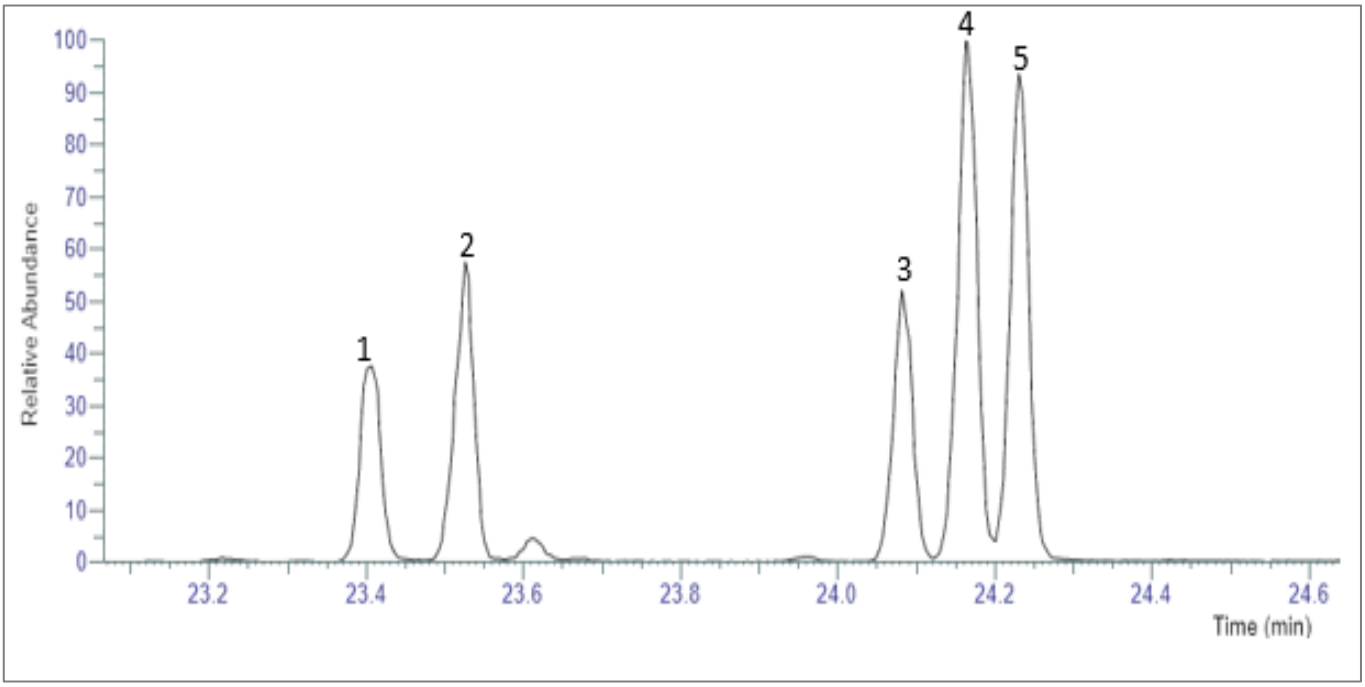
CMW	Common mixed waste
IMW	Cartonboard cuttings
SN	Special news
FN	Unsold newspapers
SBM	Unsold magazines
HL1	White printed or unprinted paper
HL2	Pastel coloured printed or unprinted paper
K4	Post-consumer corrugated containers
K3	Pre-consumer corrugated

Supplementary table 7: Responses to: What recycled paper grades do you consider as valuable and why?

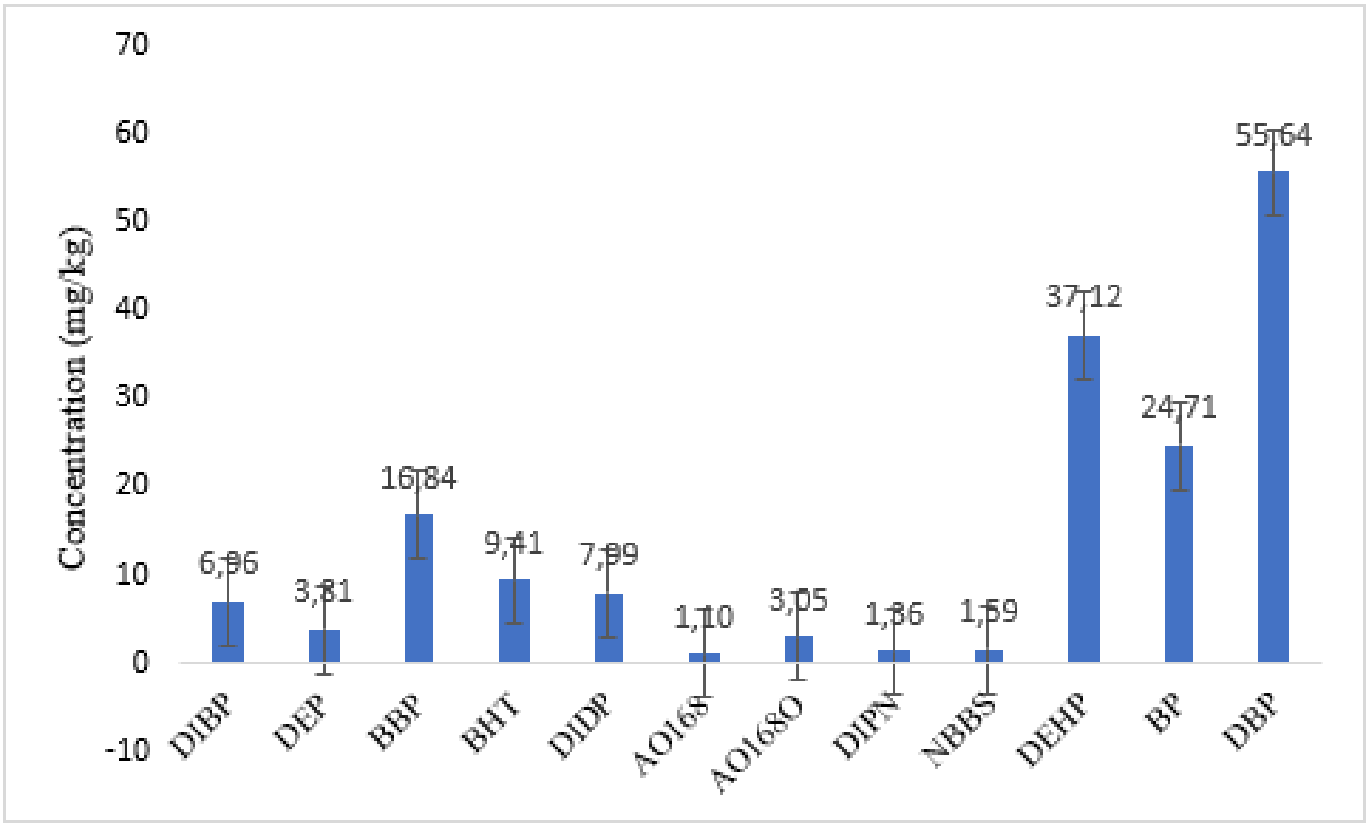
Participant	Valuable grade
1	Corrugated, most common
2	K4, HL1, highest demand
3	All grades
4	Cardboard
5	White paper
6	White paper, people like to use it
7	White paper, most expensive, get the most money
8	Office paper
9	K4 – most recovered and most readily available, most efficiently broken down
10	Demand-dependent and driven by supply issues
11	K4-paper mills, HL1 & white paper - tissue paper
12	Cardboard – can get the most from it and most collected
13	Ito quantity: K4 at ZAR1.50/kg; ito value: white paper ZAR2.50 – ZAR3.50/kg
14	Cardboard, office paper
15	Every paper is used, newspaper to cardboard paper
16	White paper, used for toilet paper industry
• K4 and white paper are the most valuable. • Most valued are the ones with the highest monetary value. Type collected is driven strongly by money and influences collection. Demand–supply influences. • Paper collecting and sorting influenced by buy-back value rate.	

Supplementary table 8: Responses to: What methods or protocols do you apply when sorting and collecting recycled paper?

Participant	Sorting and collecting protocols
1	Sorting visually according to grade, coated and laminated not visually distinguishable, remove prohibited, check moisture
2	By look
3	Separate into different types
4	Collect only cardboard, mix rest
5	Separate into same types, remove non-paper
6	Separate carboard and paper, put unwanted in bin
7	Start by sorting for white paper then cardboard, then the rest put together
8	Separate papers, then remove plastics
9	Ensure correct grading of paper
10	Currently not using technology which could make sorting of paper more efficient. Sorting of paper could be based on physical and chemical properties not just visual
11	Loose material into relevant grades, avoid mixing of papers, white paper generally removed first
12	Paper collected and sorted in skips and bins outside retail shops then sorted into relevant grades again before baling
13	Train workers, visual sorting but not easy to distinguish visually when laminated or coated
14	Samples by type, then remove unwanted or prohibited stuff, e.g. fast-food containers with food
15	Collect then put mixed together then sort cardboard and paper before baling
16	Usually comes in sorted; for those that are sorted look at what can be pulped, laminated samples can’t be broken down as water doesn’t get into it



Supplementary figure 1: A GC-MS chromatogram of relative abundance versus time showing the detected isomers of diisopropylnaphthalene, where peaks 1, 2, 3, 4, and 5 represent 1,3-DIPN, 1,7-DIPN, 2,6-DIPN, 2,7-DIPN and 1,6-DIPN, respectively.



Supplementary figure 2: Target compound ranges.