Supplementary Material (ESI) for Journal of Environmental Monitoring

Supporting Information to the Manuscript

Organic pollutants in compost and digestate; 1. Polychlorinated biphenyls, polycyclic aromatic hydrocarbons and molecular markers

Text S1

The composting and digestion process

On composting plants, delivered green and kitchen waste is chopped and mixed with woody material to achieve an adequate porosity of the substrate for an aerobic degradation process. Different systems for composting are employed: open triangle and table windrows, aerated boxes and trenches etc. Independently of the system, the substrate is regularly turned or aerated during the process to guarantee sufficient oxygen supply and consequently an aerobic decomposition. If necessary, water is added to achieve efficient degradation. The composting process can be divided in four stages according to the temperature evolution: mesophilic, thermophilic, cooling down and maturation[1]. It usually lasts between five and eight weeks. Finished compost is screened according to requirements of the application[2].
Different systems are employed for digestion (i.e., anaerobic treatment coupled with biogas production): thermophilic, mesophilic, solid and liquid digestion. The most common system for the treatment of organic kitchen and green waste is thermophilic solid digestion[3]. In this process, input materials are chopped and ferrous impurities removed. They are mixed with recycled presswater (definition see below) and fresh water to achieve a pumpable mixture, which is then inoculated with digestate. This substrate is pumped to a fermenter, where it is continuously forewarded by an archimedic spiral. Thermophilic digestion lasts about two weeks at a temperature of approximately 55 ^{o}C. The output material undergoes solid-liquid separation in a drainage system (press). The resulting solid fraction is often submitted to aerobic treatment similar techniques as for composting, whereas the liquid fraction (presswater) is stored in a tank until application to agricultural fields.

Text S2

Conversion of characteristic PAH to ratios in input material

To account for altered characteristic PAH ratios between emission and input material of compost, rectification factor as defined by Zhang et al.[4] for air particles were applied. Stable ratios during composting of the form x/(x+y) (i.e. FLT/(FLT&PYR), BaA(BaA&CHR), (IPY/(IYP&BPE)) were converted to emission source ratios ($r_{emission\ source}$) as follows:

$$r_{emission\ source} = r_{compost}/(RF_{Zhang}+r_{compost}-RF_{Zhang}*r_{compost})$$

where, $r_{compost}$ is the PAH ratio in compost and RF_{Zhang} is the rectification factor (for ANT/PHE 2.16, for FLT/PYR 1.68, for BaA/CHR 0.59, for IPY/BPE 0.92). BaP/BPE ratios were converted by deviding the $BaP/BPE_{compost}$ by RF_{Zhang}BaP/BPE (0.60).

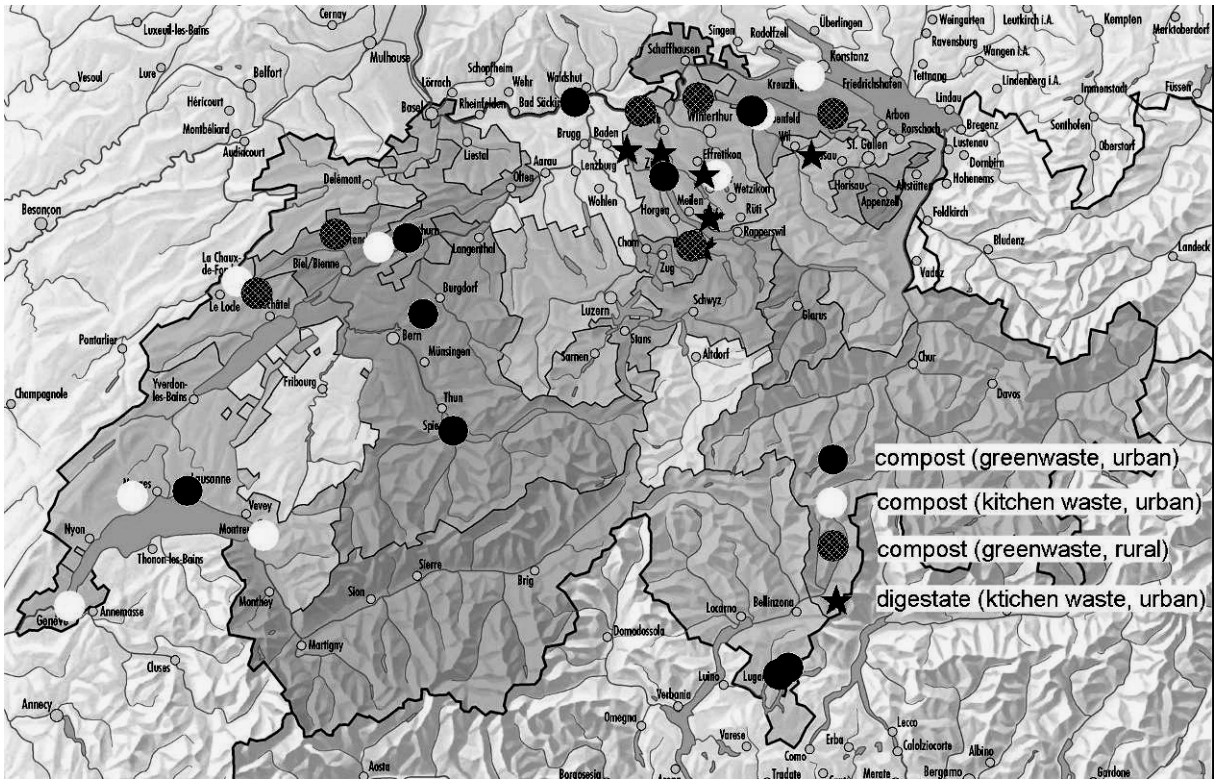

Figure S1: Sampling locations (n=31) of compost and digestate in Switzerland, some plants were sampled once, others three times to account for different seasons. For further information on individual plants, see Table 1, status May 2006

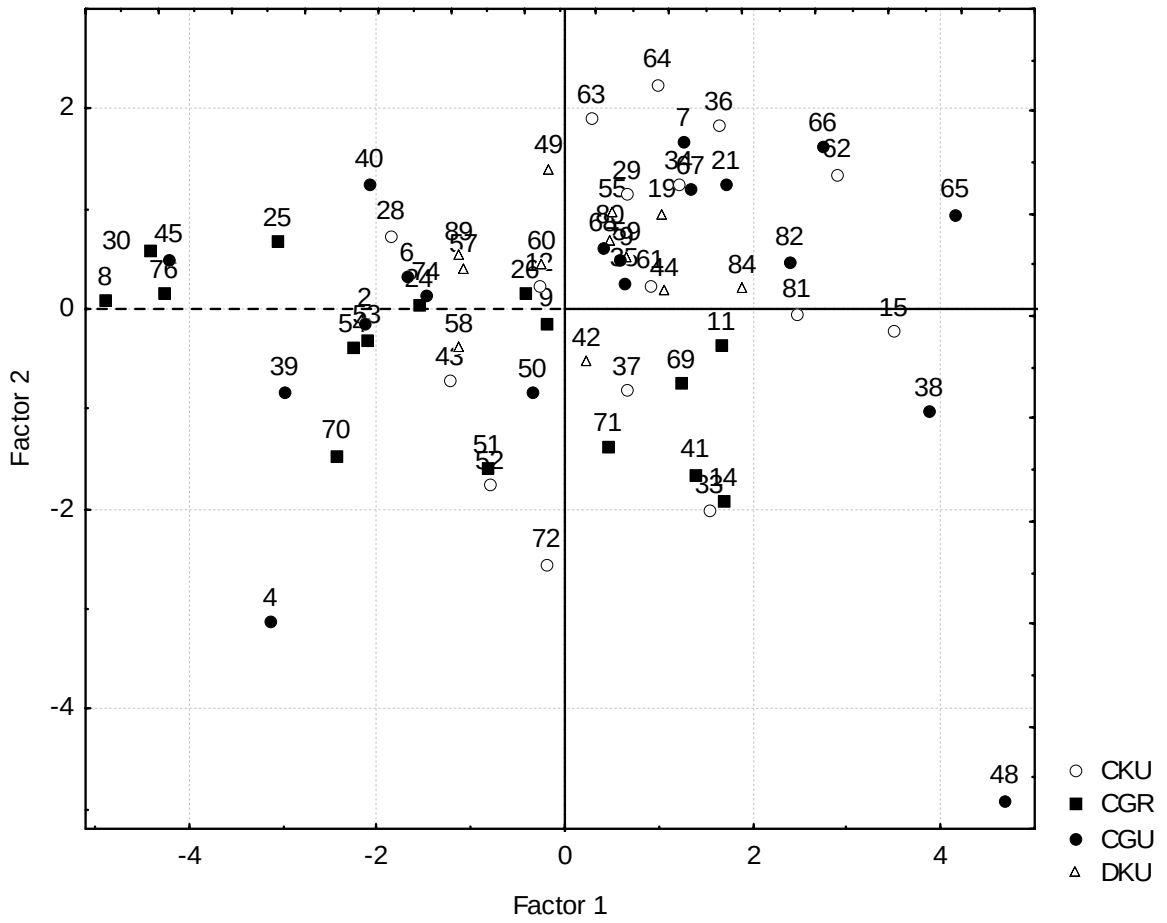

Figure S2: Factor 1 and 2 of the principal component analysis of the ratios of individual PCB (PCB 52, 95, 101, 118, 132, 138, 149, 153, 174, 180) to the total sum of 10PCB in Swiss compost and digestate (n=63). Number = sample number specified in Table 1, CKU: compost containing organic kitchen and green waste in the input material originating from urban areas, CGR: green waste compost originating from rural areas, CGU: green waste compost originating from urban areas, DKU: digestate derived from urban green and organic kitchen waste.

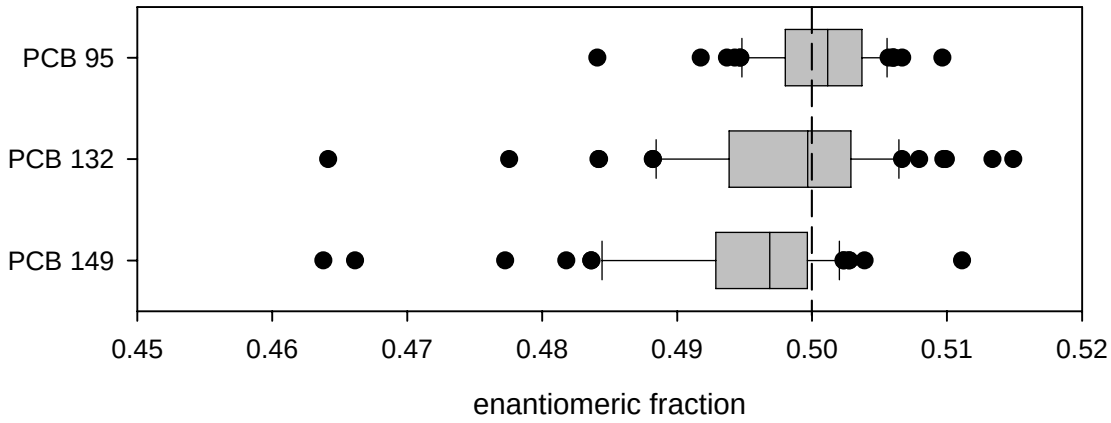

Figure S3: Enantiomeric fractions (EFs) of three antropisomeric PCB in Swiss compost and digestate (n=68).

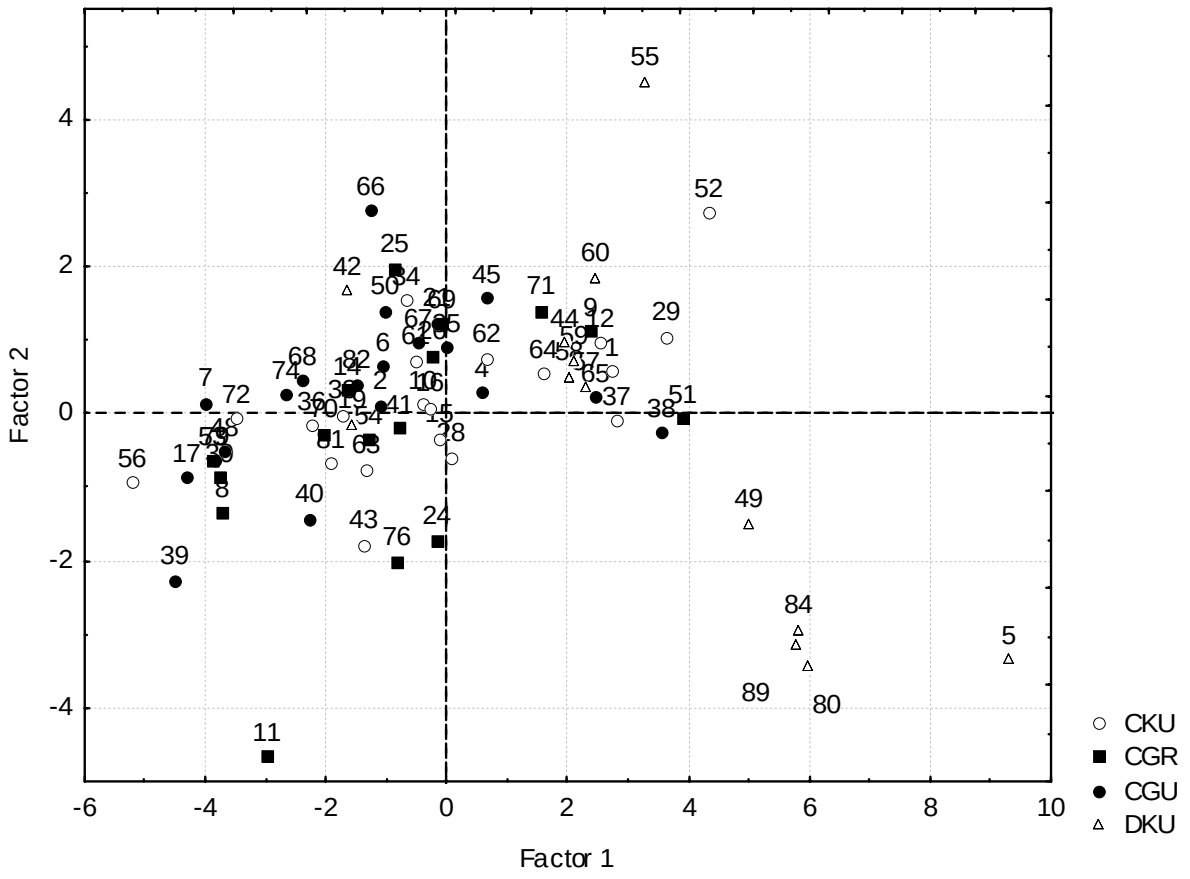

Figure S4: Factor 1 and 2 of the principal component analysis of the ratios of single PAH compounds to the total sum (Sum of 16 EPA PAH except dibenz[*a*,*h*]anthracene) in Swiss compost and digestate (n=69). Number = sample number specified in Table 1, CKU: compost containing organic kitchen and green waste in the input material originating from urban areas, CGR: green waste compost originating from rural areas, CGU: green waste compost originating from urban areas, DKU: digestate derived from urban green and organic kitchen waste.

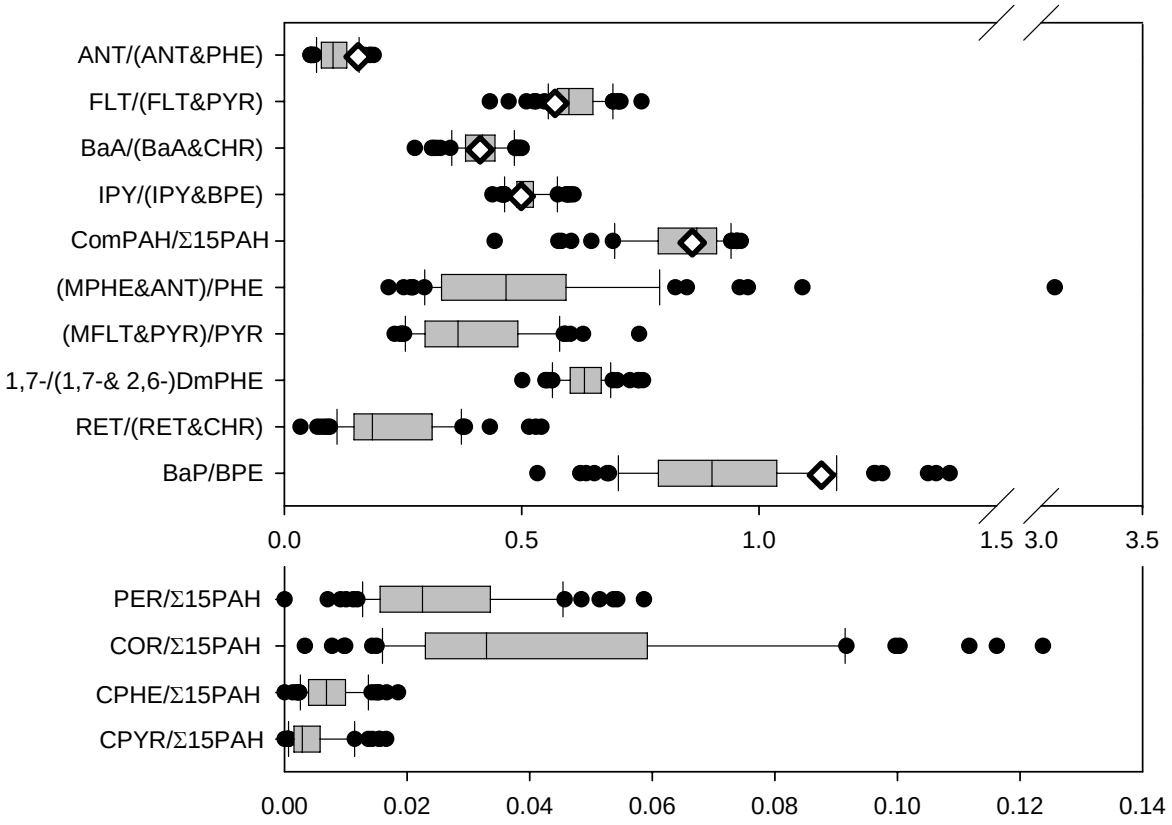

Figure S5: Characteristic PAH ratios in Swiss compost and digestate (n=69, line: median; box: 25th and 75th percentile; lines with whiskers 10th and 90th percentile, dots: outliers, diamond: median literature value, ANT: anthracene, PHE: phenanthrene, fluoranthene (FLT), pyrene (PYR), benzo[*a*]anthracene (BaA), chrysene (CHR), indeno[*1,2,3-cd*]pyrene (IPY), benzo[*ghi*]perylene (BPE), ComPAH: sum of FLT, PYR, BaA, CHR, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, benzo[*e*]pyrene (not included here), Σ15PAH: sum of 16 EPA PAH except dibenzo[*a,h*]anthracene, MPHE&ANT: methylated phenanthrene and anthracene, MFLT&PYR: methylated fluoranthene and pyrene, 1,7-/(1,7-&2,6-DmPHE): 1,7-/(1,7-& 2,6-dimethylphenanthrene), RET: retene, benzo[*a*]pyrene (BaP), benzo[*ghi*]perylene (BPE), PER: perylene, COR: coronene COR, CPHE: 4-H cyclopenta[*def*]PHE, CPYR: cyclopenta[*cd*]PYR.

Table S1: Sample description, PCB, PAH, heavy metal and nutrient contents of compost, digestate and presswater samples in Switzerland

Sample No.	1	2	4	5	6	7	8	9	10	11
Product[a]	Com	Com	Com	Dig	Com	Com	Com	Com	Com	Com
Plant code and number[b]	CKU01	CGU01	CGU10	DKU01	CGU03	CGU03	CGR01	CGR12	CKU02	CGR06
Input material[c]	kw, gw, iw	gw, iw	gw, iw	kw, gw, iw	gw	gw	gw	gw	kw, gw	gw
Origin of input material[d]	urban	urban	urban	urban	urban	urban	rural	rural	urban	rural
Season[e]	winter	winter	winter	winter	winter	summer	winter	summer	winter	winter
Plant type[f]	twl	twl	tbw	tad	twh	twh	twl	ab	ab	fec
Process duration (days)[h]	53	53	118	42	35	231	56	28	77	98
Water content [% ww]	50	46	46	49	54	42	48	45	45	58
Org matter content [% dw]	62	36	30	46	55	37	36	47	57	53
Impurity content [% dw]	0.15	0.076	0.065	0.32	0.25	0.41	0.30	0.18	0.062	0.43
Maturity (NO_3^-/NH_4^+)	nd[i]	15	10	nd[i]	nd[i]	2.2	5.9	nd[i]	nd[i]	15
Particle size [mm][j]	<40	<10	<20	<40	<40	<20	<25	not	<20	not
PCB ($\mu g/kg_{dw}$)										
PCB 28	nd	nd	7.9	nd	nd	nd	nd	nd	nd	nd
PCB 52	0.97	2.0	8.8	1.9	3.4	6.2	2.2	3.1	2.4	2.1
PCB 95	na	2.2	7.7	na	4.5	9.9	6.1	4.2	na	1.9
PCB 101	2.8	3.1	8.5	4.4	6.0	13	7.7	5.5	6.1	2.7
PCB 118	1.6	2.3	4.8	3.6	4.9	9.2	3.6	3.8	5.9	3.6
PCB 132	na	2.2	5.4	na	4.9	8.0	7.0	3.7	na	1.9
PCB 138	4.5	4.7	11	7.8	8.6	13	12	4.7	7.8	3.2
PCB 149	na	3.8	12	na	6.3	11	11	4.8	na	2.2
PCB 153	3.3	5.4	19	5.2	10	17	16	7.6	6.7	3.9
PCB 174	na	1.3	4.0	na	2.4	3.1	3.9	2.1	na	0.80
PCB 180	1.5	2.8	14	2.5	6.2	7.5	12	4.4	3.7	1.7
EF PCB 95	0.50	0.50	0.50	0.51	0.50	0.50	0.51	0.50	0.49	0.50
EF PCB 132	0.50	0.50	0.50	0.50	0.51	0.50	0.50	0.50	0.50	0.51
EF PCB 149	0.49	0.50	0.49	0.49	0.50	0.50	0.50	0.49	0.48	0.48
PAH ($\mu g/kg_{dw}$)										
NAP	19	16	32	120	27	12	42	25	48	91
ACY	3.0	2.3	5.7	11	3.8	2.7	4.9	2.3	14	2.1
ACE	17	6.8	50	740	36	4.5	7.9	38	17	1.1
FLU	43	13	61	1000	18	4.8	12	80	46	4.2
PHE	350	160	340	4200	150	62	150	770	910	69
ANT	45	18	64	700	29	10	21	45	140	5.9
FLT	620	410	760	2400	710	360	430	900	1700	170
PYR	260	170	600	1400	380	230	220	600	1200	54
BaA	130	130	270	350	240	250	240	240	650	54
CHR	180	220	360	360	340	460	380	330	680	120
BbF	130	210	370	240	340	320	440	240	760	120
BkF	69	93	210	130	190	150	230	130	530	64
BaP	83	100	190	200	190	160	220	170	590	70
IPY	96	130	190	140	190	260	230	200	600	110
BPE	110	140	220	170	200	230	240	190	530	100
CPHE	29	13	45	na	30	6.0	9.7	54	64	7.0
RET	89	170	210	56	93	71	65	190	150	28
CPYR	6.7	5.0	6.3	na	6.6	8.6	5.3	9.6	33	9.3
PER	32	33	63	na	64	54	70	55	200	28
COR	62	67	110	41	90	99	110	76	210	45
(MPHE/ANT)/PHE [-]	0.37	0.56	0.96	0.25	0.98	0.82	0.54	0.33	0.36	0.35
(MFLT/PYR)/PYR [-]	0.35	0.50	0.39	0.31	0.42	0.58	0.63	0.30	0.25	0.57
1,7-/(1,7-&2,6-DmPHE) [-]	0.66	0.68	0.60	0.50	0.65	0.65	0.68	0.64	0.64	0.70
Heavy metals (mg/kg_{dw})										
Cd	0.13	0.13	0.025	nd	0.081	0.1	0.021	0.34	0.53	0.12
Co	2.2	3.9	3.6	3.2	3.2	4.4	3.8	5.1	3.6	3.6
Cr	11	16	23	14	13	21	17	25	15	16
Cu	31	47	86	35	43	60	37	71	55	40
Ni	9.5	14	12	11	12	17	14	21	11	13
Pb	19	33	30	22	59	66	26	54	100	30
Zn	76	110	150	89	130	190	120	190	250	140

Nutrients (g/kg$_{dw}$)										
N	15	14	9.2	11	12	19	15	14	19	22
P	1.8	2.3	3.9	2.6	1.7	3.3	2.3	2.5	2.8	3.3
K	6.9	8.7	6.4	7.7	5.7	14	9.9	9.1	14	13
Mg	4.1	4.9	5.0	6.5	5.8	8.8	6.9	4.0	4.1	6.9
Ca	68	82	92	65	50	64	64	68	41	64
Further elements (g/kg$_{dw}$)										
Fe	4.5	8.9	11.0	7.6	7.1	10	9.2	11	8.2	9.9
Mn	0.31	0.44	0.34	0.40	0.34	0.44	0.69	0.43	0.37	0.46
Na	0.64	0.55	0.47	1.60	0.34	0.58	0.61	0.59	0.71	0.74
Ancillary data										
pH	8.3	8.4	8.2	8.3	8.3	8.1	8.2	7.8	8.2	8.2
Conductivity (µS/cm)	1400	1800	1800	3000	920	3600	2600	1800	2100	2500

a) Com: compost, Dig: digestate, all digestate samples were submitted to subsequent aerobic treatment except for samples 80 and 89, PW: presswater
b) plant code: C: compost, K: organic kitchen waste and green waste as input materials, G: pure green waste compost, U: urban area of input material collection, R: rural area of input material collection
c) kw: kitchen waste, gw: green waste, iw: industrial waste including paper sludge, coffee ground, tea leaves, residues from potato chips production, biodegradable plastics, edible oil, cacao
d) characterisation of the area where the input material was collected
e) season of input material collection
f) plant type: ab: aerated boxes, atc: aerated trench composting in sheds, bwc: combined box and windrow composting, fec: field-edge composting, mcd: mesophilic aerobic co-digestion, tad: thermophilic aerobic digestion, tbw: table windrows, twh: triangle windrows higher than 2 meters, twl: triangle windrows lower than 2 meters, vc: vermicomposting
g) contains small amounts of digested material in the compost input material
h) duration of the treatment process in days
i) NO_3^- nd
j) sieve-width in mm, not: unsieved
k) NH_4^+ nd

NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[*a*]anthracene, CHR: chrysene, BbF: benzo[*b*]fluoranthene, BkF: benzo[*k*]fluoranthene, BaP: benzo[*a*]pyrene, IPY: indeno[1,2,3-*cd*]pyrene, BPE: benzo[*ghi*]perylene, CPHE: 4-H-cyclopenta[*def*]PHE, RET: retene, CPYR: cylopenta[*cd*]PYR, COR: coronene, (MPHE&ANT)/PHE: ratio of methylPHE and –ANT to PHE, (MFLT&PYR)/PYR: ratio of methylFLT and -PYR to PYR, 1,7-/(1,7-&2,6-)DmPHE: the ratio of 1,7- to 1,7- and 2,6-dimethylPHE, nd: not detected, na: not available, EF enantiomeric fraction, ww: wet weight, dw: dry weight

Table S1 (cont.): Sample description, PCB, PAH, heavy metal and nutrient contents of compost, digestate and presswater samples in Switzerland

Sample No.	12	14	15	16	17	19	21	24	25	26
Product[a]	Com	Com	Com	Com	Com	Dig	Com	Com	Com	Com
Plant code and number[b]	CKU05	CGR02	CKU03	CKU04	CGU04	DKU02	CGU6	CGR03	CGR08	CGR04
Input material[c]	kw, gw, iw	gw	kw, gw	kw, gw	gw	kw, gw	gw	gw	gw	gw
Origin of input material[d]	urban	rural	urban	urban	urban	urban	rural	rural	rural	rural
Season[e]	autumn	winter	summer	autumn	autumn	winter	winter	winter	winter	autumn
Plant type[f]	bwc	twh	atc[g]	twh	tbw	tad	twh	twh	twl	twh
Process duration (days)[h]	136	83	63	210	127	105	87	87	74	203
Water content [% ww]	59	49	27	47	53	45	36	52	38	40
Org matter content [% dw]	45	40	32	41	40	42	37	37	31	27
Impurity content [% dw]	0.19	0.18	0.14	0.39	0.19	na	0.27	0.2	0.15	0.074
Maturity (NO_3^-/NH_4^+)	0.31	nd[i]	0.0079	2.5	1.1	35	0.16	1.1	4.9	0.59
Particle size [mm][j]	<20	<20	<10	<10	<20	<10	<12	<20	<20	<20
PCB ($\mu g/kg_{dw}$)										
PCB 28	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PCB 52	2.0	5.1	2.8	2.4	1.8	4.6	3.7	0.86	0.56	0.88
PCB 95	2.8	3.1	4.3	na	na	7.3	4.7	1.3	1.0	1.3
PCB 101	3.8	3.9	6.2	6.3	5.2	9.9	6.0	1.8	1.4	1.9
PCB 118	3.1	3.1	13	6.0	4.6	8.7	5.0	1.4	0.98	1.5
PCB 132	2.7	2.1	3.1	na	na	6.3	3.9	1.2	1.2	1.0
PCB 138	3.5	4.4	8.0	8.3	6.1	8.6	6.6	2.1	2.3	2.0
PCB 149	3.5	3.5	4.8	na	na	8.6	5.2	1.9	1.7	1.8
PCB 153	5.3	5.4	7.7	6.3	5.1	13	7.6	2.9	2.6	2.9
PCB 174	1.3	1.2	1.3	na	na	2.1	1.3	0.62	0.56	0.48
PCB 180	3.0	2.8	3.6	2.7	2.1	6.9	3.8	1.7	1.7	1.5
EF PCB 95	0.50	0.50	0.50	0.50	0.50	0.50	0.51	0.50	0.50	0.49
EF PCB 132	0.49	0.5	0.49	0.50	0.50	0.49	0.49	0.50	0.51	0.50
EF PCB 149	0.50	0.50	0.50	0.48	0.49	0.50	0.50	0.50	0.49	0.50
PAH ($\mu g/kg_{dw}$)										
NAP	21	22	27	19	15	49	14	55	24	19
ACY	3.2	3.9	5.1	3.0	2.4	6.0	2.5	6.3	14	2.4
ACE	33	9.0	86	9.7	4.4	20	15	24	34	8.3
FLU	50	11	78	22	9.3	28	32	60	33	13
PHE	390	160	650	140	130	340	300	430	200	190
ANT	29	28	110	21	16	44	25	33	45	22
FLT	600	510	990	420	380	760	610	470	1000	470
PYR	380	420	660	190	190	480	410	300	1100	240
BaA	150	230	470	130	190	350	230	180	810	130
CHR	240	270	470	220	390	540	360	330	1100	290
BbF	150	270	530	180	410	480	250	300	540	220
BkF	74	170	320	52	220	240	160	120	280	83
BaP	77	220	420	110	190	250	130	150	260	88
IPY	120	220	330	110	310	320	190	220	230	120
BPE	120	210	300	130	270	290	170	190	180	120
CPHE	23	18	54	18	11	16	17	23	18	5.5
RET	130	67	76	81	150	100	200	51	37	41
CPYR	14	9.0	4.1	5.4	7.6	6.4	7.3	6.4	11	1.8
PER	32	69	120	44	60	92	45	42	75	28
COR	77	90	110	40	110	130	76	120	57	58
(MPHE/ANT)/PHE [-]	0.38	0.66	0.59	0.79	0.48	0.39	0.58	0.32	0.76	0.37
(MFLT/PYR)/PYR [-]	0.30	0.32	0.49	0.57	0.48	0.39	0.38	0.39	0.42	0.34
1,7-/(1,7-&2,6-DmPHE) [-]	0.61	0.69	0.6	0.68	0.75	0.65	0.68	0.62	0.61	0.67
Heavy metals (mg/kg_{dw})										
Cd	0.032	0.20	0.21	0.22	0.16	0.18	0.064	0.18	0.29	0.15
Co	3.5	4.6	5.5	4.9	4.3	3.6	4.6	4.2	4.4	5.0
Cr	21	16	29	25	18	25	18	18	23	22
Cu	49	34	72	91	58	160	53	57	50	58
Ni	15	17	27	22	16	17	15	14	16	17
Pb	27	71	70	49	36	48	37	51	35	32
Zn	140	170	180	170	150	210	210	170	120	130

Nutrients (g/kg$_{dw}$)										
N	18	9.5	16	17	16	19	16	14	12	12
P	3.5	1.7	3.4	2.9	2.7	3.6	3.2	2.8	2.2	3.0
K	12	5.1	9.9	11	11	13	13	11	6.7	12
Mg	6.6	6.4	4.7	5.6	6.2	9.4	5.8	10	6.3	11
Ca	59	60	51	65	66	59	69	70	46	76
Further elements (g/kg$_{dw}$)										
Fe	9.2	11	16	11	9.1	10	12	9.1	11.0	11
Mn	0.41	0.48	0.43	0.40	0.46	0.50	0.45	0.45	0.55	0.93
Na	1.6	0.31	0.61	1.0	0.62	1.40	0.70	0.63	0.48	0.46
Ancillary data										
pH	8.1	8.5	8.3	8.3	8.4	8.4	8.4	8.5	8.4	8.4
Conductivity (μS/cm)	2900	1300	2800	2900	2700	3700	3600	2200	1900	3700

a) Com: compost, Dig: digestate, all digestate samples were submitted to subsequent aerobic treatment except for samples 80 and 89, PW: presswater
b) plant code: C: compost, K: organic kitchen waste and green waste as input materials, G: pure green waste compost, U: urban area of input material collection, R: rural area of input material collection
c) kw: kitchen waste, gw: green waste, iw: industrial waste including paper sludge, coffee ground, tea leaves, residues from potato chips production, biodegradable plastics, edible oil, cacao
d) characterisation of the area where the input material was collected
e) season of input material collection
f) plant type: ab: aerated boxes, atc: aerated trench composting in sheds, bwc: combined box and windrow composting, fec: field-edge composting, mcd: mesophilic aerobic co-digestion, tad: thermophilic aerobic digestion, tbw: table windrows, twh: triangle windrows higher than 2 meters, twl: triangle windrows lower than 2 meters, vc: vermicomposting
g) contains small amounts of digested material in the compost input material
h) duration of the treatment process in days
i) NO_3^- nd
j) sieve-width in mm, not: unsieved
k) NH_4^+ nd

NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[*a*]anthracene, CHR: chrysene, BbF: benzo[*b*]fluoranthene, BkF: benzo[*k*]fluoranthene, BaP: benzo[*a*]pyrene, IPY: indeno[1,2,3-*cd*]pyrene, BPE: benzo[*ghi*]perylene, CPHE: 4-H-cyclopenta[*def*]PHE, RET: retene, CPYR: cylopenta[*cd*]PYR, COR: coronene, (MPHE&ANT)/PHE: ratio of methylPHE and –ANT to PHE, (MFLT&PYR)/PYR: ratio of methylFLT and -PYR to PYR, 1,7-/(1,7-&2,6-)DmPHE: the ratio of 1,7- to 1,7- and 2,6-dimethylPHE, nd: not detected, na: not available, EF enantiomeric fraction, ww: wet weight, dw: dry weight

Table S1 (cont.): Sample description, PCB, PAH, heavy metal and nutrient contents of compost, digestate and presswater samples in Switzerland

Sample No.	28	29	30	33	34	35	36	37	38	39
Product[a]	Com	Com	Com	Com	Com	Com	Com	Com	Com	Com
Plant code and number[b]	CKU02	CKU01	CGR01	CKU03	CKU04	CGU04	CKU07	CKU07	CGU05	CGU08
Input material[c]	kw, gw	kw, gw, iw	gw	kw, gw	kw, gw	gw	kw, gw	kw, gw	gw	gw
Origin of input material[d]	urban	urban	rural	urban	urban	urban	urban	urban	urban	urban
Season[e]	summer	summer	summer	summer	summer	summer	summer	summer	summer	autumn
Plant type[f]	ab	twl	twl	atc[g]	tbw	twh	twl[g]	twl[g]	atc	twh
Process duration (days)[h]	55	50	70	35	91	96	87	107	33	298
Water content [% ww]	45	49	35	39	37	43	43	50	43	45
Org matter content [% dw]	51	51	27	34	36	45	41	53	44	24
Impurity content [% dw]	0.078	0.017	0.15	0.13	2.5	0.26	0.22	0.047	0.21	0.17
Maturity (NO_3^-/NH_4^+)	0.38	nd[i]	2.0	0.032	0.48	nd[i]	46	nd[i]	nd[i]	25
Particle size [mm][j]	<20	<40	<25	<10	not	<40	<10	<40	<20	<20
PCB ($\mu g/kg_{dw}$)										
PCB 28	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PCB 52	1.5	2.0	5.1	3.0	1.8	2.0	2.9	2.7	4.7	0.73
PCB 95	2.6	3.1	13	3.9	2.3	2.9	4.4	3.4	4.7	2.1
PCB 101	3.4	3.8	15	5.3	3.2	4.0	5.9	4.6	6.0	2.3
PCB 118	2.4	2.9	6.0	9.5	2.8	4.0	5.2	3.9	8.3	1.8
PCB 132	2.4	2.4	15	3.4	2.0	2.6	3.8	2.3	2.4	1.8
PCB 138	5.2	4.6	17	3.8	4.2	3.7	7.2	3.3	6.4	3.9
PCB 149	3.8	3.5	22	4.8	2.6	3.4	4.8	4.1	4.5	2.9
PCB 153	5.8	4.9	31	7.4	4.2	5.8	7.2	6.6	6.6	4.3
PCB 174	1.0	1.1	6.0	1.7	0.76	1.2	1.2	1.5	1.6	0.86
PCB 180	3.8	2.8	20	4.9	2.2	2.9	3.8	2.9	3.2	2.3
EF PCB 95	0.50	0.50	0.50	0.48	0.50	0.50	0.50	0.50	0.50	0.50
EF PCB 132	0.46	0.48	0.50	0.51	0.50	0.48	0.49	0.50	0.50	0.49
EF PCB 149	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
PAH ($\mu g/kg_{dw}$)										
NAP	36	17	28	23	9.1	15	20	38	16	27
ACY	28	3.2	3.6	2.5	1.7	2.2	4.3	2.9	3.7	4.5
ACE	23	120	8.6	9.0	4.6	32	8.5	120	120	2.1
FLU	73	35	15	21	4.5	40	17	210	140	4.6
PHE	1100	350	160	300	220	420	170	870	810	59
ANT	210	26	24	28	13	25	35	51	77	11
FLT	2000	600	500	550	400	650	520	910	760	210
PYR	1500	460	250	300	280	490	310	660	560	180
BaA	770	130	270	260	180	250	240	290	240	170
CHR	810	190	430	300	250	340	440	370	310	200
BbF	890	150	500	320	220	320	390	310	220	230
BkF	480	71	230	170	100	160	170	160	110	110
BaP	620	84	260	210	98	200	170	220	160	200
IPY	960	99	320	320	110	230	250	210	150	190
BPE	540	93	290	200	110	200	220	200	170	240
CPHE	88	37	6.6	20	2.7	27	8.9	66	46	12
RET	68	94	85	66	93	200	210	170	58	18
CPYR	31	1.5	2.6	4.7	1.3	2.2	1.9	3.0	8.1	12
PER	180	27	87	60	34	63	56	68	51	64
COR	190	39	120	78	40	77	87	70	71	140
(MPHE/ANT)/PHE [-]	0.36	0.44	0.44	0.52	0.48	0.38	0.73	0.31	0.27	0.62
(MFLT/PYR)/PYR [-]	0.30	0.25	0.51	0.47	0.33	0.33	0.49	0.37	0.30	0.50
1,7-/(1,7-&2,6-DmPHE) [-]	0.58	0.63	0.66	0.62	0.65	0.68	0.69	0.63	0.59	0.57
Heavy metals (mg/kg_{dw})										
Cd	0.25	nd	0.099	0.13	nd	nd	nd	nd	nd	0.032
Co	4.4	3.4	4.3	5.3	4.9	3.9	3.9	3.6	3.4	5.4
Cr	16	15	20	28	25	15	20	14	19	13
Cu	58	44	59	110	64	48	59	47	36	47
Ni	14	13	17	27	24	15	18	15	14	16
Pb	61	29	59	65	38	39	32	45	32	46
Zn	190	110	140	190	140	130	150	110	140	160

Nutrients (g/kg$_{dw}$)										
N	26	19	11	16	17	17	19	18	20	9.6
P	4.3	2.9	2.2	3.9	3.0	3.0	3.0	2.7	3.6	1.3
K	25	16	7.6	7.4	14	15	13	14	15	2.2
Mg	5.1	4.1	7.1	4.7	5.0	5.0	7.7	5.9	4.5	9.5
Ca	70	53	58	53	53	46	75	58	31	41
Further elements (g/kg$_{dw}$)										
Fe	9.7	7.2	10	15	10	8.9	9.7	8.3	8.9	14
Mn	0.42	0.34	0.67	0.43	0.40	0.38	0.38	0.31	0.41	0.32
Na	0.81	0.71	0.49	0.54	0.75	0.65	0.66	0.61	0.75	0.18
Ancillary data										
pH	8.5	8.5	8.3	8.3	8.1	8.2	7.8	8.2	8.3	8.0
Conductivity (µS/cm)	4500	3200	1800	2200	4400	5300	4100	4400	4300	680

a) Com: compost, Dig: digestate, all digestate samples were submitted to subsequent aerobic treatment except for samples 80 and 89, PW: presswater
b) plant code: C: compost, K: organic kitchen waste and green waste as input materials, G: pure green waste compost, U: urban area of input material collection, R: rural area of input material collection
c) kw: kitchen waste, gw: green waste, iw: industrial waste including paper sludge, coffee ground, tea leaves, residues from potato chips production, biodegradable plastics, edible oil, cacao
d) characterisation of the area where the input material was collected
e) season of input material collection
f) plant type: ab: aerated boxes, atc: aerated trench composting in sheds, bwc: combined box and windrow composting, fec: field-edge composting, mcd: mesophilic aerobic co-digestion, tad: thermophilic aerobic digestion, tbw: table windrows, twh: triangle windrows higher than 2 meters, twl: triangle windrows lower than 2 meters, vc: vermicomposting
g) contains small amounts of digested material in the compost input material
h) duration of the treatment process in days
i) NO_3^- nd
j) sieve-width in mm, not: unsieved
k) NH_4^+ nd

NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[*a*]anthracene, CHR: chrysene, BbF: benzo[*b*]fluoranthene, BkF: benzo[*k*]fluoranthene, BaP: benzo[*a*]pyrene, IPY: indeno[1,2,3-*cd*]pyrene, BPE: benzo[*ghi*]perylene, CPHE: 4-H-cyclopenta[*def*]PHE, RET: retene, CPYR: cylopenta[*cd*]PYR, COR: coronene, (MPHE&ANT)/PHE: ratio of methylPHE and –ANT to PHE, (MFLT&PYR)/PYR: ratio of methylFLT and -PYR to PYR, 1,7-/(1,7-&2,6-)DmPHE: the ratio of 1,7- to 1,7- and 2,6-dimethylPHE, nd: not detected, na: not available, EF enantiomeric fraction, ww: wet weight, dw: dry weight

Table S1 (cont.): Sample description, PCB, PAH, heavy metal and nutrient contents of compost, digestate and presswater samples in Switzerland

Sample No.	40	41	42	43	44	45	48	49	50	51
Product[a]	Com	Com	Dig	Com	Dig	Com	Com	Dig	Com	Com
Plant code and number[b]	CGU07	CGR02	DKU05	CKU08	DKU06	CGU01	CGU02	DKU01	CGU03	CGR04
Input material[c]	gw	gw	kw, gw, iw	kw, gw	kw, gw, iw	gw, iw	gw, iw	kw, gw, iw	gw	gw
Origin of input material[d]	urban	rural	urban	urban	urban	urban	rural	urban	urban	rural
Season[e]	autumn	summer	summer	summer	summer	summer	summer	summer	summer	summer
Plant type[f]	twh	twh	tad	twl	twl[g]	twl	twh	tad	twh	twh
Process duration (days)[h]	168	70	91	70	28	70	105	20	49	105
Water content [% ww]	59	51	43	43	52	39	34	44	52	32
Org matter content [% dw]	42	33	34	23	43	31	44	51	51	39
Impurity content [% dw]	0.12	0.064	1.4	0.10	0.33	0.081	0.044	0.40	0.28	0.11
Maturity (NO_3^-/NH_4^+)	33	0.4	0.41	30	0.083	0.28	0.14	nd[i]	nd[i]	nd[i]
Particle size [mm][j]	<20	<20	<40	<15	<40	not	<10	<40	<40	not
PCB ($\mu g/kg_{dw}$)										
PCB 28	nd	nd	nd	nd	nd	nd	21	nd	nd	nd
PCB 52	1.9	3.5	4.0	1.3	2.1	1.5	25	1.5	3.8	0.88
PCB 95	3.7	2.6	4.4	2.3	2.8	4.1	9.4	2.9	4.8	1.4
PCB 101	4.8	3.4	5.8	2.9	3.7	5.3	10	4.4	6.6	1.8
PCB 118	3.7	2.4	4.1	3.5	2.8	2.4	15	4.1	5.3	1.6
PCB 132	3.1	1.6	2.9	1.9	1.8	4.1	5.4	2.7	3.2	0.60
PCB 138	5.2	3.4	6.1	3.5	4.0	8.3	9.4	6.1	7.2	1.8
PCB 149	4.8	2.9	5.5	3.4	3.2	7.4	9.4	3.9	6.5	1.8
PCB 153	7.2	4.5	8.4	5.2	4.6	10	13	6.7	9.5	3.9
PCB 174	1.5	0.96	1.6	1.0	0.99	2.3	2.5	1.3	2.2	0.50
PCB 180	5.0	2.7	4.8	2.9	2.7	6.7	8.0	2.7	5.8	1.5
EF PCB 95	0.50	0.49	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
EF PCB 132	0.51	0.50	0.50	0.50	0.51	0.50	0.50	0.50	0.49	0.50
EF PCB 149	0.49	0.50	0.50	0.50	0.49	0.50	0.51	0.49	0.50	0.49
PAH ($\mu g/kg_{dw}$)										
NAP	14	22	11	25	22	18	22	65	13	13
ACY	1.2	4.3	1.8	3.0	3.1	2.8	3.5	8.9	1.8	4.1
ACE	1.8	14	4.1	8.8	56	11	5.5	220	18	110
FLU	3.1	26	4.2	25	64	15	9.0	210	15	110
PHE	38	220	73	140	410	240	77	1300	230	800
ANT	2.5	23	14	17	41	22	11	180	24	66
FLT	120	520	450	240	760	650	310	1100	660	770
PYR	52	260	410	110	490	420	410	800	500	540
BaA	30	170	170	110	200	150	190	240	250	160
CHR	80	280	290	170	300	240	300	340	340	270
BbF	73	260	290	160	240	220	380	290	330	230
BkF	27	110	140	61	120	110	190	150	190	120
BaP	36	150	110	93	130	120	190	200	200	120
IPY	57	180	220	110	200	200	400	210	270	160
BPE	67	170	140	110	130	130	250	160	200	120
CPHE	7.3	11	5.0	8.3	38	11	7.4	68	19	46
RET	43	66	110	18	56	54	320	68	67	120
CPYR	9.3	3.7	1.7	8.6	5.0	2.6	4.2	6.3	8.6	2.7
PER	23	58	37	34	37	30	51	55	59	33
COR	43	79	54	63	52	65	130	54	81	51
(MPHE/ANT)/PHE [-]	0.33	0.42	1.1	0.22	0.36	0.57	3.1	0.30	0.53	0.33
(MFLT/PYR)/PYR [-]	0.32	0.41	0.28	0.51	0.29	0.25	0.36	0.29	0.28	0.28
1,7-/(1,7-&2,6-DmPHE) [-]	0.76	0.64	0.65	0.68	0.62	0.62	0.67	0.57	0.64	0.61
Heavy metals (mg/kg_{dw})										
Cd	0.45	0.17	0.022	0.11	0.013	0.21	0.16	0.01	0.025	0.015
Co	6.2	5.4	5.1	5.9	2.9	5.4	3.2	5.3	3.8	4.1
Cr	41	21	24	24	13	20	17	31	16	18
Cu	68	48	69	36	35	55	110	31	49	55
Ni	22	18	20	22	9.7	18	10	9.2	14	14
Pb	58	53	40	38	25	34	45	17	53	27
Zn	210	120	120	110	90	140	120	79	160	140

Nutrients (g/kg$_{dw}$)										
N	21	13	13	10	14	15	12	15	19	15
P	3.3	2.5	3.6	2.1	2.8	3.9	1.7	3.3	3.1	3.1
K	7.1	8.1	11	6.6	12	11	6.9	12	16	16
Mg	7.0	6.4	9.5	13	8.9	4.4	4.4	7.3	7.3	9.0
Ca	30	53	66	62	84	39	44	58	52	63
Further elements (g/kg$_{dw}$)										
Fe	16	12	11	13	6.9	13.0	5.4	7.2	8.8	9.2
Mn	0.49	0.56	0.58	0.71	0.38	0.61	0.24	0.35	0.37	0.57
Na	0.29	0.43	1.0	0.44	0.95	0.55	0.65	1.4	0.50	0.47
Ancillary data										
pH	8.2	8.4	8.0	8.4	8.5	8.3	8.2	8.6	8.5	8.5
Conductivity (µS/cm)	1400	2100	4000	2000	3700	3900	1800	3000	3400	4200

a) Com: compost, Dig: digestate, all digestate samples were submitted to subsequent aerobic treatment except for samples 80 and 89, PW: presswater
b) plant code: C: compost, K: organic kitchen waste and green waste as input materials, G: pure green waste compost, U: urban area of input material collection, R: rural area of input material collection
c) kw: kitchen waste, gw: green waste, iw: industrial waste including paper sludge, coffee ground, tea leaves, residues from potato chips production, biodegradable plastics, edible oil, cacao
d) characterisation of the area where the input material was collected
e) season of input material collection
f) plant type: ab: aerated boxes, atc: aerated trench composting in sheds, bwc: combined box and windrow composting, fec: field-edge composting, mcd: mesophilic aerobic co-digestion, tad: thermophilic aerobic digestion, tbw: table windrows, twh: triangle windrows higher than 2 meters, twl: triangle windrows lower than 2 meters, vc: vermicomposting
g) contains small amounts of digested material in the compost input material
h) duration of the treatment process in days
i) NO_3^- nd
j) sieve-width in mm, not: unsieved
k) NH_4^+ nd

NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[*a*]anthracene, CHR: chrysene, BbF: benzo[*b*]fluoranthene, BkF: benzo[*k*]fluoranthene, BaP: benzo[*a*]pyrene, IPY: indeno[1,2,3-*cd*]pyrene, BPE: benzo[*ghi*]perylene, CPHE: 4-H-cyclopenta[*def*]PHE, RET: retene, CPYR: cylopenta[*cd*]PYR, COR: coronene, (MPHE&ANT)/PHE: ratio of methylPHE and –ANT to PHE, (MFLT&PYR)/PYR: ratio of methylFLT and -PYR to PYR, 1,7-/(1,7-&2,6-)DmPHE: the ratio of 1,7- to 1,7- and 2,6-dimethylPHE, nd: not detected, na: not available, EF enantiomeric fraction, ww: wet weight, dw: dry weight

Table S1 (cont.): Sample description, PCB, PAH, heavy metal and nutrient contents of compost, digestate and presswater samples in Switzerland

Sample No.	52	53	54	55	56[k]	57	58	59	60	61
Product[a]	Com	Com	Com	Dig	Com	Dig	Dig	Dig	Dig	Com
Plant code and number[b]	CKU09	CGR08	CGR03	DKU02	CKU06	DKU01	DKU03	DKU04	DKU02	CKU03
Input material[c]	kw, gw	gw	kw, gw	kw, gw	kw, gw	kw, gw, iw	kw, gw, iw	kw, gw, iw	kw, gw	kw, gw
Origin of input material[d]	urban	rural	rural	urban	urban	urban	urban	urban	urban	urban
Season[e]	summer	summer	summer	summer	summer	autumn	autumn	autumn	autumn	autumn
Plant type[f]	ab	twl	twg	tab	tbw[g]	tad	tad	tad	tad	atc
Process duration (days)[h]	43	113	134	126	174	19	29	7	49	43
Water content [% ww]	45	47	49	34	37	47	31	55	41	52
Org matter content [% dw]	43	30	35	47	26	50	34	51	49	46
Impurity content [% dw]	0.082	0.061	0.13	2.3	0.086	0.35	0.062	0.32	0.038	0.29
Maturity (NO_3^-/NH_4^+)	nd[i]	68	0.43	0.22	11	nd[i]	0.72	0.016	0.22	0.076
Particle size [mm][j]	<10	<10	<20	not	<10	<20	<10	<20	not	<10
PCB (µg/kg$_{dw}$)										
PCB 28	1.8	nd	nd	nd	nd	nd	nd	nd	nd	nd
PCB 52	4.9	0.58	0.78	3.3	6.2	3.5	3.6	3.1	2.9	2.8
PCB 95	3.7	1.1	1.4	5	31	5.1	4.8	3.6	4.8	4.1
PCB 101	4.9	1.3	2.0	6.8	73	6.6	6.1	4.9	6.3	5.5
PCB 118	3.2	1.1	1.7	5.9	130	5.0	4.9	3.4	5.1	4.8
PCB 132	2.8	0.78	1.2	4.0	69	4.9	4.2	2.9	3.9	3.1
PCB 138	5.6	1.9	2.9	8.6	130	7.9	6.9	5.2	7.1	5.6
PCB 149	5.5	1.6	2.2	6.2	78	7.0	6.5	4.3	6.1	4.7
PCB 153	8.0	2.5	3.6	9.5	140	9.8	9.4	6.3	8.9	6.9
PCB 174	1.5	0.5	0.74	1.6	17	2.4	2.3	1.5	2.1	1.6
PCB 180	5.0	1.4	2.2	5.1	57	6.0	6.1	2.9	5.0	4.2
EF PCB 95	0.50	0.49	0.50	0.50	0.50	0.51	0.50	0.51	0.50	0.50
EF PCB 132	0.49	0.49	0.50	0.50	0.50	0.49	0.50	0.50	0.48	0.50
EF PCB 149	0.50	0.49	0.50	0.50	0.50	0.49	0.50	0.49	0.50	0.50
PAH (µg/kg$_{dw}$)										
NAP	26	17	46	31	20	31	56	40	25	14
ACY	5.1	4.1	6.7	6.1	3.0	4.9	4.3	3.7	3.8	1.6
ACE	140	8.7	42	69	5.9	33	21	75	41	4.3
FLU	200	9.2	71	55	9.7	53	34	98	33	8.0
PHE	870	56	450	1200	91	710	550	980	550	180
ANT	94	13	53	100	15	72	46	72	42	13
FLT	2200	200	830	3900	350	840	730	1100	920	370
PYR	1300	190	660	3000	220	580	470	830	680	180
BaA	500	220	410	930	360	220	190	340	230	120
CHR	510	380	580	1100	440	310	310	450	310	180
BbF	270	220	570	660	470	280	240	370	250	150
BkF	160	120	270	360	250	130	110	190	120	69
BaP	210	120	370	330	320	170	110	270	130	94
IPY	180	140	420	360	300	180	140	270	170	110
BPE	190	130	320	260	310	180	140	260	160	120
CPHE	100	8.3	29	100	7.5	25	8.2	45	18	6.8
RET	110	29	73	110	65	110	68	89	140	98
CPYR	18	11	7.9	6	9.6	8.8	5.3	8.3	5.8	6.2
PER	69	41	87	88	88	58	37	84	48	35
COR	93	58	150	97	160	84	69	120	83	61
(MPHE/ANT)/PHE [-]	0.51	0.75	0.43	0.52	0.58	0.32	0.32	0.29	0.37	0.51
(MFLT/PYR)/PYR [-]	0.31	0.6	0.37	0.25	0.75	0.28	0.25	0.28	0.23	0.38
1,7-/(1,7-&2,6-DmPHE) [-]	0.56	0.61	0.64	0.58	0.63	0.6	0.57	0.60	0.62	0.67
Heavy metals (mg/kg$_{dw}$)										
Cd	0.092	0.088	0.17	0.01	0.13	0.010	0.010	0.12	0.065	0.12
Co	4.2	4.6	4.5	3.4	5.3	2.7	2.6	3.1	3.2	4.2
Cr	19	24	40	21	22	21	21	21	24	24
Cu	57	46	59	56	59	50	44	59	50	86
Ni	13	17	25	15	18	13	14	15	15	22
Pb	54	45	62	36	70	19	22	32	42	48
Zn	150	140	170	130	160	110	120	130	130	170

nutrients (g/kg$_{dw}$)										
N	17	16	14	18	13	18	16	16	17	18
P	2.9	3.1	3.1	3.9	2.9	3.6	3.7	2.9	3.6	3.4
K	15	14	14	16	9.7	13	14	12	15	12
Mg	8.1	7.1	11	10	9.3	8.0	7.6	6.8	9.7	5.1
Ca	69	45	69	56	61	67	150	68	60	61
Further elements (g/kg$_{dw}$)										
Fe	8.4	12	10	9.0	12	8.9	9.2	9.5	9.7	10
Mn	0.36	0.59	0.49	0.45	0.59	0.42	0.40	0.41	0.44	0.37
Na	0.86	1.0	0.59	1.2	0.50	2.0	1.5	1.5	1.3	0.90
Ancillary data										
pH	8.5	8.2	8.5	8.3	8.2	8.4	8.1	8.5	8.2	8.6
Conductivity (µS/cm)	4200	4900	3500	4300	2800	3200	3900	2900	3400	2400

a) Com: compost, Dig: digestate, all digestate samples were submitted to subsequent aerobic treatment except for samples 80 and 89, PW: presswater
b) plant code: C: compost, K: organic kitchen waste and green waste as input materials, G: pure green waste compost, U: urban area of input material collection, R: rural area of input material collection
c) kw: kitchen waste, gw: green waste, iw: industrial waste including paper sludge, coffee ground, tea leaves, residues from potato chips production, biodegradable plastics, edible oil, cacao
d) characterisation of the area where the input material was collected
e) season of input material collection
f) plant type: ab: aerated boxes, atc: aerated trench composting in sheds, bwc: combined box and windrow composting, fec: field-edge composting, mcd: mesophilic aerobic co-digestion, tad: thermophilic aerobic digestion, tbw: table windrows, twh: triangle windrows higher than 2 meters, twl: triangle windrows lower than 2 meters, vc: vermicomposting
g) contains small amounts of digested material in the compost input material
h) duration of the treatment process in days
i) NO_3^- nd
j) sieve-width in mm, not: unsieved
k) NH_4^+ nd

NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[*a*]anthracene, CHR: chrysene, BbF: benzo[*b*]fluoranthene, BkF: benzo[*k*]fluoranthene, BaP: benzo[*a*]pyrene, IPY: indeno[1,2,3-*cd*]pyrene, BPE: benzo[*ghi*]perylene, CPHE: 4-H-cyclopenta[*def*]PHE, RET: retene, CPYR: cylopenta[*cd*]PYR, COR: coronene, (MPHE&ANT)/PHE: ratio of methylPHE and –ANT to PHE, (MFLT&PYR)/PYR: ratio of methylFLT and -PYR to PYR, 1,7-/(1,7-&2,6-)DmPHE: the ratio of 1,7- to 1,7- and 2,6-dimethylPHE, nd: not detected, na: not available, EF enantiomeric fraction, ww: wet weight, dw: dry weight

Table S1 (cont.): Sample description, PCB, PAH, heavy metal and nutrient contents of compost, digestate and presswater samples in Switzerland

Sample No.	62	63	64	65	66	67	68	69	70	71
Product[a]	Com	Com	Com	Com	Com	Com	Com	Com	Com	Com
Plant code and number[b]	CKU03	CKU02	CKU01	CGU05	CGU05	CGU02	CGU02	CGR02	CGR03	CGR04
Input material[c]	kw, gw	kw, gw	kw, gw, iw	gw	gw	gw, iw	gw, iw	gw	gw	gw
Origin of input material[d]	urban	urban	urban	rural	rural	rural	rural	rural	rural	rural
Season[e]	winter	autumn	autumn	autumn	winter	autumn	winter	autumn	autumn	winter
Plant type[f]	atc	ab	twl	atc	atc	tbw	tbw	twh	twh	twh
Process duration (days)[h]	56	73	73	12	18	94	63	103	72	84
Water content [% ww]	42	57	59	44	50	57	58	51	53	41
Org matter content [% dw]	53	52	46	43	48	52	40	35	29	38
Impurity content [% dw]	0.17	0.0089	0.021	0.082	0.4	0.036	nd	0.034	0.21	0.017
Maturity (NO_3^-/NH_4^+)	nd[i]	nd[i]	nd[i]	nd[i]	nd[i]	nd[i]	0.47	13	1.2	nd[i]
Particle size [mm][j]	<10	<20	<40	<20	<20	<20	<20	<20	<20	not
PCB ($\mu g/kg_{dw}$)										
PCB 28	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PCB 52	2.9	2.2	2.5	5.9	3.6	2.6	2.6	1.8	0.92	1.4
PCB 95	4.5	3.9	4.4	5.9	4.7	3.5	3.2	2.0	1.4	1.6
PCB 101	6.6	5.6	6.5	7.4	6.0	4.3	4.0	2.7	1.9	2.2
PCB 118	6.5	3.9	7.6	5.1	3.9	3.1	2.8	2.4	1.4	2.1
PCB 132	3.4	3.8	4.4	3.3	3.2	2.7	2.6	1.3	1.1	1.1
PCB 138	6.3	5.1	11	7.1	5.9	4.7	4.4	2.5	2.1	2.1
PCB 149	4.8	4.6	5.3	5.1	4.5	3.7	3.7	2.2	2.2	1.9
PCB 153	6.9	9.0	10	7.2	6.5	5.5	5.5	3.5	3.2	2.9
PCB 174	1.4	1.1	1.3	1.8	1.2	1.2	1.2	0.96	0.85	0.87
PCB 180	3.2	3.3	3.8	2.5	3.0	2.4	2.8	1.7	2.1	1.7
EF PCB 95	0.51	0.49	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
EF PCB 132	0.50	0.51	0.50	0.49	0.50	0.50	0.50	0.50	0.50	0.50
EF PCB 149	0.49	0.50	0.50	0.49	0.49	0.50	0.49	0.50	0.50	0.49
PAH ($\mu g/kg_{dw}$)										
NAP	17	54	15	19	18	24	10	5.5	16	11
ACY	2.1	14	2.4	3.0	2.8	3.8	3.0	0.81	2.1	1.4
ACE	13	6.8	29	84	4.0	39	5.4	5.5	7.7	7.0
FLU	20	21	59	120	8.1	48	11	7.6	16	7.6
PHE	270	540	430	860	160	300	190	93	120	120
ANT	23	89	31	82	18	44	22	10	14	11
FLT	420	1200	580	910	1100	880	630	200	280	240
PYR	290	630	370	620	630	610	340	140	170	190
BaA	150	540	170	310	570	360	280	80	150	66
CHR	190	590	230	360	650	480	410	110	210	97
BbF	150	600	200	300	430	380	380	73	150	62
BkF	80	310	94	160	230	200	170	44	89	37
BaP	110	420	130	230	230	280	260	48	110	39
IPY	110	470	150	200	250	280	280	59	130	54
BPE	110	460	150	200	250	270	260	68	150	62
CPHE	16	21	34	44	18	50	18	7.9	10	7.8
RET	100	78	81	81	100	120	99	34	35	60
CPYR	6.0	20	6.1	4.5	12	6.1	5.7	7.0	12	6.1
PER	38	140	49	70	60	81	81	20	31	14
COR	61	210	76	87	110	120	120	41	98	38
(MPHE/ANT)/PHE [-]	0.50	0.30	0.33	0.30	0.74	0.60	0.6	0.47	0.48	0.47
(MFLT/PYR)/PYR [-]	0.36	0.29	0.35	0.39	0.51	0.46	0.55	0.33	0.44	0.24
1,7-/(1,7-&2,6-DmPHE) [-]	0.65	0.66	0.62	0.59	0.61	0.63	0.63	0.62	0.65	0.69
Heavy metals (mg/kg_{dw})										
Cd	0.058	0.49	0.10	0.11	0.076	0.053	0.52	0.11	0.28	0.28
Co	3.6	4.2	3.5	3.6	2.9	2.9	3.8	4.3	4.2	4.2
Cr	22	21	21	26	21	17	20	23	25	25
Cu	110	64	45	48	51	44	51	47	53	87
Ni	20	15	15	17	15	12	14	16	15	20
Pb	150	98	29	41	38	38	42	31	42	42
Zn	160	230	120	170	170	130	150	140	140	140

nutrients (g/kg$_{dw}$)										
N	16	20	16	17	18	14	15	15	9.8	13
P	2.9	3.5	2.5	3.7	3.2	2.6	2.9	2.8	2.5	3.1
K	7.9	17	10	16	13	10	12	12	12	15
Mg	4.6	4.9	4.4	4.7	4.6	5.3	6.0	6.2	10	9.2
Ca	56	77	71	40	53	75	82	64	38	70
Further elements (g/kg$_{dw}$)										
Fe	9.3	11	8.9	11	9.1	7.6	10	12	10	9.7
Mn	0.36	0.45	0.37	0.46	0.48	0.32	0.39	0.52	0.45	1.0
Na	0.88	0.61	0.49	0.59	0.71	0.49	0.50	0.34	0.52	0.34
Ancillary data										
pH	8.5	8.5	8.6	8.7	8.6	8.5	8.4	8.6	8.5	8.7
Conductivity (µS/cm)	1800	3400	2100	3300	2400	1800	1900	2400	3100	2600

a) Com: compost, Dig: digestate, all digestate samples were submitted to subsequent aerobic treatment except for samples 80 and 89, PW: presswater
b) plant code: C: compost, K: organic kitchen waste and green waste as input materials, G: pure green waste compost, U: urban area of input material collection, R: rural area of input material collection
c) kw: kitchen waste, gw: green waste, iw: industrial waste including paper sludge, coffee ground, tea leaves, residues from potato chips production, biodegradable plastics, edible oil, cacao
d) characterisation of the area where the input material was collected
e) season of input material collection
f) plant type: ab: aerated boxes, atc: aerated trench composting in sheds, bwc: combined box and windrow composting, fec: field-edge composting, mcd: mesophilic aerobic co-digestion, tad: thermophilic aerobic digestion, tbw: table windrows, twh: triangle windrows higher than 2 meters, twl: triangle windrows lower than 2 meters, vc: vermicomposting
g) contains small amounts of digested material in the compost input material
h) duration of the treatment process in days
i) NO_3^- nd
j) sieve-width in mm, not: unsieved
k) NH_4^+ nd

NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[*a*]anthracene, CHR: chrysene, BbF: benzo[*b*]fluoranthene, BkF: benzo[*k*]fluoranthene, BaP: benzo[*a*]pyrene, IPY: indeno[1,2,3-*cd*]pyrene, BPE: benzo[*ghi*]perylene, CPHE: 4-H-cyclopenta[*def*]PHE, RET: retene, CPYR: cylopenta[*cd*]PYR, COR: coronene, (MPHE&ANT)/PHE: ratio of methylPHE and –ANT to PHE, (MFLT&PYR)/PYR: ratio of methylFLT and -PYR to PYR, 1,7-/(1,7-&2,6-)DmPHE: the ratio of 1,7- to 1,7- and 2,6-dimethylPHE, nd: not detected, na: not available, EF enantiomeric fraction, ww: wet weight, dw: dry weight

Table S1 (cont.): Sample description, PCB, PAH, heavy metal and nutrient contents of compost, digestate and presswater samples in Switzerland

Sample No.	72	74	76	79	80	81	82	84	85	89
Product[a]	Com	Com	Com	Com	Dig	Com	Com	Dig	PW	Dig
Plant code and number[b]	CKU06	CGU01	CGR01	CGU03	DKU03	CKU04	CGU04	DKU04	DKU04	DKU04
Input material[c]	kw, gw, iw	gw, iw	gw	gw	kw, gw	kw, gw	gw	kw, gw, iw	kw, gw, iw	kw, gw, iw
Origin of input material[d]	urban	rural	rural	urban	urban	urban	urban	urban	urban	urban
Season[e]	autumn	autumn	winter	autumn	summer	winter	winter	winter	summer	summer
Plant type[f]	tbw[g]	twl	twl	twh	tad	tbw	twh	tad	tad	tad
Process duration (days)[h]	142	173	na	179	16	84	121	49	35	na
Water content [% ww]	41	44	39	47	52	51	54	51	93	51
Org matter content [% dw]	32	28	24	40	29	56	45	48	47	44
Impurity content [% dw]	0.012	0.0069	0.012	0.015	0.078	0.05	0.014	0.2	na	0.15
Maturity (NO_3^-/NH_4^+)	14	nd[k]	38	33	nd[i]	nd[i]	nd[i]	nd[i]	na	nd[i]
Particle size [mm][j]	<10	<10	<10	<20	<20	<40	<20	<10	not	<40
PCB ($\mu g/kg_{dw}$)										
PCB 28	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
PCB 52	5.2	1.5	2.2	4.2	2.3	1.5	2.1	3.3	3.2	2.4
PCB 95	4.4	2.6	8.2	6.5	3.9	1.9	2.6	3.6	4.1	4.0
PCB 101	5.5	3.2	9.3	8.2	4.1	2.6	3.6	4.6	6.0	5.4
PCB 118	4.1	2.2	3.8	6.0	3.7	2.5	3.4	4.3	5.1	3.3
PCB 132	2.9	2.1	6.9	4.6	2.9	1.3	1.9	2.5	3.3	3.0
PCB 138	5.0	4.0	11	8.5	4.8	2.3	3.4	5.5	6.8	6.6
PCB 149	5.4	3.5	14	7.4	3.8	2.0	2.7	3.7	6.0	5.5
PCB 153	7.8	5.2	18	11	6.9	2.9	4.0	6.0	9.3	8.7
PCB 174	2.1	1.2	3.9	2.2	1.3	0.66	0.99	1.3	1.7	1.5
PCB 180	6.1	3.1	12	6.2	3.1	1.6	2.0	3.0	5.1	4.6
EF PCB 95	0.49	0.50	0.50	0.50	0.50	0.50	0.51	0.51	0.51	0.51
EF PCB 132	0.49	0.50	0.49	0.50	0.50	0.49	0.50	0.50	0.50	0.50
EF PCB 149	0.50	0.50	0.49	0.49	0.46	0.48	0.47	0.48	0.49	0.50
PAH ($\mu g/kg_{dw}$)										
NAP	8.0	11	140	16	88	15	12	150	390	200
ACY	1.8	2.0	3.0	2.4	14	2.1	2.1	21	18	14
ACE	7.3	2.0	50	2.4	160	9.2	9.9	540	750	610
FLU	7.4	3.3	46	4.9	200	13	23	490	750	660
PHE	73	42	330	80	1000	170	200	1800	2000	2100
ANT	13	5.6	72	10	110	14	14	210	210	300
FLT	230	170	510	350	720	290	410	1600	1500	1600
PYR	160	100	340	150	530	150	300	1100	1200	1200
BaA	190	120	320	160	170	140	190	430	480	520
CHR	230	180	380	320	220	180	270	450	560	540
BbF	170	92	320	300	140	160	230	360	340	440
BkF	110	53	170	120	70	85	120	190	220	240
BaP	120	51	240	160	110	130	160	280	300	370
IPY	130	66	220	220	89	140	180	230	310	280
BPE	150	77	230	220	96	140	190	220	330	270
CPHE	5.1	4	25	6.7	69	13	19	120	130	160
RET	46	35	74	59	50	200	320	110	94	72
CPYR	6.4	7.3	9.6	8.6	20	13	13	13	33	9.3
PER	38	18	69	50	40	43	52	93	100	120
COR	84	56	110	130	42	68	100	120	210	120
(MPHE/ANT)/PHE [-]	0.85	0.6	0.43	0.66	0.3	0.45	0.47	0.27	0.23	0.27
(MFLT/PYR)/PYR [-]	0.59	0.59	0.53	0.59	0.38	0.56	0.39	0.31	0.36	0.35
1,7-/(1,7-&2,6-DmPHE) [-]	0.56	0.56	0.62	0.66	0.55	0.73	0.74	0.56	0.56	0.55
Heavy metals (mg/kg_{dw})										
Cd	0.14	0.13	0.26	0.15	0.13	0.01	0.022	0.0090	0.46	0.0059
Co	5.4	5.0	4.4	3.8	2.0	2.9	3.3	2.8	8.0	3.6
Cr	24	23	19	20	12	19	18	20	50	24
Cu	64	51	38	63	21	54	52	69	100	50
Ni	18	19	16	16	8.2	15	15	14	39	17
Pb	48	37	25	47	19	26	30	25	73	32
Zn	160	150	120	190	60	110	140	120	340	110

nutrients (g/kg$_{dw}$)										
N	21	15	12	18	9.4	13	16	13	25	12
P	4.0	3.4	2.6	2.9	2.0	1.9	2.6	2.8	6.5	3.1
K	15	10	9.7	12	6.4	8.8	11	8.5	33	11
Mg	11	4.7	6.7	8	6.2	3.7	5.3	5.7	9.1	6.4
Ca	71	66	61	66	150	47	61	59	31	64
Further elements (g/kg$_{dw}$)										
Fe	14	12	11	10	5.4	7.7	8.8	9.7	19	12
Mn	0.53	0.58	0.55	0.45	0.27	0.32	0.38	0.40	0.80	0.52
Na	0.65	0.44	0.41	0.30	1.2	0.55	0.54	1.7	4.2	1.3
Ancillary data										
pH	7.9	8.3	8.4	8.5	8.5	8.6	8.6	8.5	na	8.6
Conductivity (µS/cm)	6200	2900	3300	2500	3000	1600	2300	2900	na	2600

a) Com: compost, Dig: digestate, all digestate samples were submitted to subsequent aerobic treatment except for samples 80 and 89, PW: presswater
b) plant code: C: compost, K: organic kitchen waste and green waste as input materials, G: pure green waste compost, U: urban area of input material collection, R: rural area of input material collection
c) kw: kitchen waste, gw: green waste, iw: industrial waste including paper sludge, coffee ground, tea leaves, residues from potato chips production, biodegradable plastics, edible oil, cacao
d) characterisation of the area where the input material was collected
e) season of input material collection
f) plant type: ab: aerated boxes, atc: aerated trench composting in sheds, bwc: combined box and windrow composting, fec: field-edge composting, mcd: mesophilic aerobic co-digestion, tad: thermophilic aerobic digestion, tbw: table windrows, twh: triangle windrows higher than 2 meters, twl: triangle windrows lower than 2 meters, vc: vermicomposting
g) contains small amounts of digested material in the compost input material
h) duration of the treatment process in days
i) NO_3^- nd
j) sieve-width in mm, not: unsieved
k) NH_4^+ nd

NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[*a*]anthracene, CHR: chrysene, BbF: benzo[*b*]fluoranthene, BkF: benzo[*k*]fluoranthene, BaP: benzo[*a*]pyrene, IPY: indeno[1,2,3-*cd*]pyrene, BPE: benzo[*ghi*]perylene, CPHE: 4-H-cyclopenta[*def*]PHE, RET: retene, CPYR: cylopenta[*cd*]PYR, COR: coronene, (MPHE&ANT)/PHE: ratio of methylPHE and –ANT to PHE, (MFLT&PYR)/PYR: ratio of methylFLT and -PYR to PYR, 1,7-/(1,7-&2,6-)DmPHE: the ratio of 1,7- to 1,7- and 2,6-dimethylPHE, nd: not detected, na: not available, EF enantiomeric fraction, ww: wet weight, dw: dry weight

Table S1 (cont.): Sample description, PCB, PAH, heavy metal and nutrient contents of compost, digestate and presswater samples in Switzerland

Sample No.	90	91
Product[a]	PW	PW
Plant code and number[b]	DKU04	DKU02
Input material[c]	kw, gw, iw	kw, gw
Origin of input material[d]	urban	urban
Season[e]	summer	summer
Plant type[f]	tad	tad
Process duration (days)[h]	7	7
Water content [% ww]	85	85
Org matter content [% dw]	39	42
Impurity content [% dw]	na	na
Maturity (NO_3^-/NH_4^+)	na	na
Particle size [mm][j]	not	not
PCB (µg/kg$_{dw}$)		
PCB 28	nd	nd
PCB 52	2.0	2.0
PCB 95	2.6	2.9
PCB 101	3.5	3.9
PCB 118	3.0	3.6
PCB 132	2.2	2.4
PCB 138	3.9	4.5
PCB 149	3.7	4.1
PCB 153	5.6	6.4
PCB 174	1.1	1.3
PCB 180	3.1	3.7
EF PCB 95	0.49	0.50
EF PCB 132	0.50	0.49
EF PCB 149	0.49	0.49
PAH (µg/kg$_{dw}$)		
NAP	240	280
ACY	11	11
ACE	390	260
FLU	500	290
PHE	1400	1200
ANT	220	140
FLT	1100	1000
PYR	810	770
BaA	320	290
CHR	370	350
BbF	310	290
BkF	160	150
BaP	250	250
IPY	210	220
BPE	210	220
CPHE	110	86
RET	50	45
CPYR	10	13
PER	80	81
COR	140	130
(MPHE/ANT)/PHE [-]	0.27	0.26
(MFLT/PYR)/PYR [-]	0.39	0.37
1,7-/(1,7-&2,6-DmPHE) [-]	0.55	0.58
Heavy metals (mg/kg$_{dw}$)		
Cd	0.23	0.16
Co	6.1	5.6
Cr	40	37
Cu	77	72
Ni	31	27
Pb	57	60
Zn	250	260

nutrients (g/kg$_{dw}$)		
N	21	23
P	5.2	6.2
K	26	31
Mg	8.5	11
Ca	32	37
Further elements (g/kg$_{dw}$)		
Fe	16	13
Mn	0.63	0.62
Na	2.8	2.7
Ancillary data		
pH	na	na
Conductivity (µS/cm)	na	na

a) Com: compost, Dig: digestate, all digestate samples were submitted to subsequent aerobic treatment except for samples 80 and 89, PW: presswater
b) plant code: C: compost, K: organic kitchen waste and green waste as input materials, G: pure green waste compost, U: urban area of input material collection, R: rural area of input material collection
c) kw: kitchen waste, gw: green waste, iw: industrial waste including paper sludge, coffee ground, tea leaves, residues from potato chips production, biodegradable plastics, edible oil, cacao
d) characterisation of the area where the input material was collected
e) season of input material collection
f) plant type: ab: aerated boxes, atc: aerated trench composting in sheds, bwc: combined box and windrow composting, fec: field-edge composting, mcd: mesophilic aerobic co-digestion, tad: thermophilic aerobic digestion, tbw: table windrows, twh: triangle windrows higher than 2 meters, twl: triangle windrows lower than 2 meters, vc: vermicomposting
g) contains small amounts of digested material in the compost input material
h) duration of the treatment process in days
i) NO_3^- nd
j) sieve-width in mm, not: unsieved
k) NH_4^+ nd

NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[*a*]anthracene, CHR: chrysene, BbF: benzo[*b*]fluoranthene, BkF: benzo[*k*]fluoranthene, BaP: benzo[*a*]pyrene, IPY: indeno[1,2,3-*cd*]pyrene, BPE: benzo[*ghi*]perylene, CPHE: 4-H-cyclopenta[*def*]PHE, RET: retene, CPYR: cylopenta[*cd*]PYR, COR: coronene, (MPHE&ANT)/PHE: ratio of methylPHE and –ANT to PHE, (MFLT&PYR)/PYR: ratio of methylFLT and -PYR to PYR, 1,7-/(1,7-&2,6-)DmPHE: the ratio of 1,7- to 1,7- and 2,6-dimethylPHE, nd: not detected, na: not available, EF enantiomeric fraction, ww: wet weight, dw: dry weight

Table S2: Aerial deposition rates of PCB and PAH and their content in manure, sewage sludge and background soils.

	deposition rate, mean (min, max)	Ref	manure, mean (min, max)	Ref	sewage sludge, mean (min, max)	Ref	soil (mean)	Ref
Σ7PCB[a]	12 mg/ha/y (3.72-68)	[5, 6]	20 µg/kg$_{dw}$ (8-42)	[7]	100 µg/kg$_{dw}$ (38-152)	[8]	2.5 µg/kg$_{dw}$	[9]
Σ16PAH[b]	1.61 g/ha/y (0.14[c]-19[d])	[10-12]	150 µg/kg$_{dw}$ (66-339)	[7]	6.9 µg/kg$_{dw}$ (1.01-22.64)	[8]	225 µg/kg$_{dw}$	[13]

a) Sum of PCB 28, 52, 101, 118, 138, 153, 180

b) Sum of 16 PAH defined by the US EPA

c) Σ16PAH except naphthalene, but with acefenantrilene, benzo[*a*]fluorene, benzo[*ghi*]fluoranthene, cyclopenta[*cd*]pyrene, triphenylene, benzo[*b*]fluoranthene, benzo[*e*]pyrene, perylene, indeno[*7,1,2,3-cd*]chrysene, coronene

d) Σ16PAH without naphthalene and indeno[*1,2,3-cd*]pyrene

Table S3: Phosphate content of manure, sewage sludge, compost, digestate and presswater and resulting application rates per hectare (ha).

	phosphate content (P_2O_5) (g/kg$_{dw}$)	Reference	Application rate (t$_{dw}$/ha) for a fertilizing effect of 70kg/ha P_2O_5
manure	dairy cow manure: 20 dairy followers manure: 20 suckler cow manure: 19 beef cattle manure: 19 gestating sow manure: 64 nursing sow manure: 64 boar manure: 64 piglets manure (till 25kg): 88 fattening pig manure: 88	[14]	2.9
sewage sludge	61	[15]	1.1
compost	6.9	median this study	10.1
digestate	7.2	median this study	9.7
presswater	14.2	median this study	4.9

Table S4: Characteristic PAH ratios, molecular markers, and respective values in compost and digestate

	petrogenic[a]	**pyrogenic**[a]	**Swiss compost**[b]	**compost con**[c]
ANT/(ANT&PHE)	<0.1 [d]	>0.1 [d]	0.10 (0.05;0.19)	<; 0.05 (0.03;0.10)
BaA/(BaA&CHR)	<0.2 [d]	>0.35 [d]	0.42 (0.27;0.50)	=; 0.55 (0.39;0.63)
FLT/(FLT&PYR)	<0.4 [d]	>0.4 [d]	0.60 (0.45;0.75)	=; 0.47 (0.31;0.64)
IPY/(IPY&BPE)	<0.2 [d]	>0.2 [d]	0.50 (0.44;0.61)	=; 0.58 (0.46;0.63)
ComPAH/Σ16PAH	0.3 [d]	0.7 [d]	0.87 (0.43;0.96) [e]	<; na [f]
(MPHE&ANT)/PHE	5 [d]	0.5 [d]	0.47 (0.22;3.07)	>/<; na [f]
(MFLT&PYR)/PYR	4 [d]	0.3 [d]	0.37 (0.23;0.75)	=/>; na [f]
1,7-/(1,7-&2,6-)DmPHE	0.45-0.7 [d,g]	<0.45 or 0.7-0.9 [d]	0.63 (0.50;0.76)	=; na [f]
	fuel combustion	**grass/wood/coal combustion**		
FLT/(FLT&PYR)	0.4-0.5 [d]	>0.5 [d]	0.6 (0.43;0.75)	=; 0.47 (0.31;0.64)
IPY/(IPY&BPE)	0.2-0.5 [d]	>0.5 [d]	0.5 (0.44;0.61)	=; 0.58 (0.46;0.63)
RET/(RET&CHR)	0.15-0.5 [h]	0.83 [i]/0.96 [h, i]	0.19 (0.03;0.54)	>/=; na [f]
1,7-/(1,7-&2,6-)DmPHE	<0.45 [d, j]	0.7-0.9 [d, i]		=; na [f]
	diagenetic	**pyrogenic**		
PER/Σ16PAH	>0.05 [k]	<0.05 [k]	0.02 (0, 0.06)	>/<; na [f]
	non-traffic	**traffic**		
BaP/BPE	<0.6 [d,]	>0.6 [d,]	0.90 (0.53;1.4)	=; 1.50 (0.89;2.34)
1,7-/(1,7-&2,6-)DmPHE	>0.45 [d,]	<0.45 [d,]		=; na [f]
Markers				
COR/Σ15PAH	COR: vehicle exhaust [e]		0.03 (0.003;0.12) [e]	</=; na [e]
CPHE/Σ15PAH	CPHE: pyrogenic marker[l]		0.01 (0;0.02) [e]	>; na [e]
CPYR/Σ15PAH	CPYR: wood or traffic marker [m]		0.003 (0;0.017) [e]	>; na [e]

a) prevalent discrimination levels
b) median (min, max) n=69
c) quantitative alteration during composting[16] and ratios after applying conversion factor for air particles suggested by Zhang [4]
d) characteristic ratio according to [13] and references therein
e) dibenzo(*a*,*h*)anthracene was not determined, instead of Σ16PAH it is referred to Σ15PAH
f) conversion factor not available
g) also mixed combustion sources
h) [17]
i) softwood combustion,
j) vehicle emission,
k) [18]
l) [19]
m) [20, 21]

ANT: anthracene, PHE: phenanthrene, BaA: benzo[*a*]anthracene; CHR: chrysene; FLU: fluoranthene, PYR: pyrene, IPY: indeno[*1,2,3-cd*]pyrene, BPE: benzo[*ghi*]perylene (BPE), ComPAH (Sum of FLT, PYR, BaA, CHR, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, benzo[*a*]pyrene (BaP), IPY, BPE), M: methylated, Dm: dimethylated, RET: retene, PER: perylene, COR: coronene COR, CPHE: 4-H cyclopenta[*def*]PHE, CPYR: cyclopenta[*cd*]PYR

Table S5: References of emission profiles used to compare PAH source profiles from compost with

Source type	Reference
asphalt	22
break particles	23
coal	24
coal combustion	24-30
coal tar	31
Diesel	32-37
Diesel soot	25, 32, 33, 35, 37-42
dust	43
gasoline	34, 44
gasoline soot	25, 38, 40, 41, 44-49
green waste combustion	30, 50, 51
kerosene	36
kerosene combustion	52
lawn mower	53
oil	32, 36, 54
oil burning soot	38, 46
orimulsion®*	36
residue of Diesel burning	37
road dust	23
tar	32
tire wear	23
traffic emission	25, 55
waste combustion	30, 55, 56
weathered oil	36
wood ash	57
wood combustion	20, 25-28, 38, 52, 56, 58-64

*bitumen-based fuel

Table S6: Limit and guide values respectively for organic pollutants in compost in different European countries [65-67]

	Austria	Denmark	Luxemburg	France	Switzerland
PCB[a]	1 mg/kg_{dw}		0.1 mg/kg_{dw}		
PAH[b]	6 mg/kg_{dw}	3 mg/kg_{dw}	10 mg/kg_{dw}		4 mg/kg_{dw}
Fluoranthene				4 mg/kg_{dw}	
Benzo(b)fluoranthene				2.5 mg/kg_{dw}	
Benzo(a)pyrene				1.5 mg/kg_{dw}	
Remarks	Limit values for mixed municipal solid waste compost	Limit value for biowaste compost	guide value		guide value

[a]PCB: polychlorinated biphenyls; [b]PAH: polycyclic aromatic hydrocarbons, sum of 16 PAH defined by US EPA

In some countries such as Austria, Germany, the Netherlands, Sweden and Belgium, voluntary quality assurance systems have been established [65]

Table S7: Estimated effects of factors and coefficients of continuous variables kept in the final linear model explaining enantiomeric fractions of atropisomeric PCB in compost and digestate[a] along with correpsonding values of r^2, the coefficient of determination[b].

	EF PCB 95	EF PCB 132	EF PCB 149
Treatment process (anaerobic/aerobic)	**0.002**	0.001	**-0.003**
Season of input material collection (autumn/remaining year)	-0.001	-0.00007	0.001
Season of input material collection ((summer/spring)/remaining year)	-0.001	**0.003**	-0.003
Duration of the treatment process	-0.001	0.002	-0.001
r^2 of the model	0.20	0.07	0.20

a) significant effects and coefficients are bold for p-value<=0.05 and italic for 0.05<p-value<=0.1. Positive values of effects imply higher concentrations in first level and positive coefficients imply higher concentrations with higher values of the predictor.
b) r^2 is the fraction of explained variation by the model. It varies between 0 and 1 with the higher the value the more successful is the linear model in explaining the variation in the responses.

Table S8 Estimated effects of factors and coefficients of continuous variables kept in the final linear model explaining characteristic PAH ratios in compost and digeate and corresponding coefficients along with correpsonding values of r^2, the coefficient of determination[b].

	FLT/ (FLT&PYR)	BaA/ (BaA&CHR)	IPY/ (IPY&BPE)	BaP/BPE	1,7-/(1,7-& 2,6DmPHE)
Treatment process (anaerobic/aerobic)	-0.013	0.007	0.005	**0.066**	**-0.029**
Season of input material collection (autumn/remaining year)	**0.020**	-0.011	**-0.018**	**-0.106**	0.001
Season of input material collection ((summer/spring)/remaining year)	**-0.024**	0.002	**0.030**	**0.080**	-0.012
Particle size (>20 mm /≤20mm)	*-0.027*	*0.019*	0.001	*0.079*	-0.019
Maturity (NO_3^-/NH_4^+)	*0.030*	**-0.062**	-0.005	**-0.160**	0.010
r^2 of the model	0.19	0.31	0.38	0.35	0.29

a) significant effects and coefficients are bold for p-value<=0.05 and italic for 0.05<p-value<=0.1. Positive values of effects imply higher concentrations in first level and positive coefficients imply higher concentrations with higher values of the predictor.
b) r^2 is the fraction of explained variation by the model. It varies between 0 and 1 with the higher the value the more successful is the linear model in explaining the variation in the responses.

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