Table 1 Properties of the soils used in this study, modified from Duan et al. (2014)

Soil ID	TOC (%)	DOC (mg/L)	pH_w	EC (μS/cm)	CEC ($cmol_C$/kg)	Partical size fraction (%)			Surface area (m^2/g)	mesopore volume (cm^3/g)	Pore size (Å)	PF[1] < 6 nm (%)	FPAC[2] (%)
						Sand	Silt	Clay					
MTA	7.5	103.2	5.1	87	6.37	61.9	16.8	21.2	51.7	0.097	76.2	24.4	5.1
I	5.06	108.4	5.1	69.1	7.91	68.1	21.2	10.7	6.02	0.012	81.4	24.7	14.4
BDA	3.27	95.5	6	75.5	38.7	53.0	16.1	30.9	4.01	0.008	81.3	22.8	7.3
GTA	2.88	80.4	6.3	144	31.8	49.4	26.9	23.7	7.12	0.013	71.1	23.9	6.3
TXA	0.96	21.8	6.2	36.9	6.4	80.6	11.2	8.1	15.0	0.020	54.2	39.9	17.6
N	1.71	47.7	7.1	402	9.44	87.6	6.7	5.7	7.9	0.008	39.4	51.0	20.1
GIA	0.78	18.2	5.9	53.6	4.73	78.1	16.2	5.6	9.91	0.012	49.0	46.7	27.9
GIB	0.72	8.5	7.8	192	11.1	65.2	14.3	20.5	35.3	0.041	46.2	49.9	48.3

[1] pore volume proportion for average pore width < 6 nm.

[2] FPAC (Fine particle associated carbon), estimated by (Silt + Clay)/TOC.

Table 2. Area under the plasma B[a]P concentration-time curve (AUC) and faecal excretion of B[a]P following IV injection or oral dosing in sand

Treatment (µg B[a]P/kg bw)	IV	Oral dose (in sand)			
	100 (n = 3)	20 (n = 4)	40 (n = 4)	60 (n = 3[*])	100 (n = 3[*])
AUC (µg/L·h)	11.9 ± 1.4	0.21 ± 0.18	0.68 ± 0.11	1.15 ± 0.47	2.53 ± 0.33
AB (%)		8.9 ± 7.6	14.3 ± 2.2	16.1 ± 6.5	21.3 ± 2.7
		Average: 15.1 ± 5.1			
Faecal excretion (%)	0.2 ± 0.1	12.2 ± 4.2	14.8 ± 1.3	12.6 ± 5.2	19.1 ± 5.0
		Average: 14.7 ± 4.8			
BA (%)	99.8 ± 0.1	87.8 ± 4.2	85.2 ± 1.3	87.4 ± 5.2	80.9 ± 5.0
		Average: 85.3 ± 4.8			

Results shown in mean ± SD.

AB (absolute bioavailability), calculated by equation 1.

Faecal excretion, the amount of B[a]P excreted in faeces divided by the dose given to each rat. Where the excreted amount in faeces was determined by the DCM/Ace extraction.

BA (bioavailability), calculated by equation 1, where dosed amount was estimated by the spiked concentration and the dosing rate.

[*] Trimmed mean of 5 replicates

Table 3. Comparison of oral bioavailability of B[a]P in soils between the rat and swine models (all in percentage)

Soil name	Ageing time (day)	Extractbility[1]		Rat model			Swine model[1]
		DCM/Ace	BuOH	Faecal excretion	BA	RB_{rat}	RB_{swine}
MTA	50	57.0 ± 8.2	48.0 ± 5.1	11.7 ± 1.5	88.3	42.3 ± 7.5	88.6 ± 36.6
	90	51.0 ± 9.2	29.3 ± 2.6	10.6 ± 1.7	89.4	45.5 ± 5.7	62.7 ± 10.1
BDA	50	23.1 ± 1.1	19.9 ± 0.6	9.3 ± 2.3	90.7	29.5 ± 4.5	62.8 ± 16.3
	90	22.8 ± 0.9	9.7 ± 0.5	8.9 ± 1.2	91.1	26.7 ± 3.4	38.9 ± 1.7*
N	50	62.2 ± 0.8	58.1 ± 0.9	7.5 ± 0.9	92.5	45.1 ± 11.0	105.3 ± 42.0
	90	59.2 ± 0.6	52.4 ± 0.8	9.3 ± 1.6	90.7	46.1 ± 4.3	108.1 ± 8.0
I	50	36.8 ± 1.5	25.1 ± 0.1	4.5 ± 1.4	95.5	31.6 ± 1.0	71.1 ± 17.4
	90	31.7 ± 2.1	16.9 ± 0.3	7.9 ± 1.0*	92.1	31.7 ± 1.6	56.2 ± 13.4
GTA	90	16.9 ± 0.5	8.9 ± 0.4	3.5 ± 0.4	96.5	27.5 ± 4.1	40.3 ± 5.4
TXA	90	27.9 ± 3.7	20.8 ± 2.3	2.5 ± 0.9	97.5	24.2 ± 4.5	33.2 ± 5.3
GIA	90	12.2 ± 0.5	10.9 ± 0.4	0.8 ± 0.2	99.2	27.6 ± 5.8	22.1 ± 0.4
GIB	90	47.4 ± 1.5	30.6 ± 3.0	2.5 ± 0.4	97.5	24.5 ± 3.4	51.7 ± 27.6

[1] Same soils were used in both the rat and the swine model, data published before in the swine study (Duan et al. 2014).

Extractability is determined by the amount of B[a]P that could be extracted by the specific extraction method divided by the spiked soil concentration. The DCM/Ace extraction (described in the Materials and Methods section) is an exhaustive method that used to estimate soil PAH concentration; BuOH extraction was described in Duan et al. (2014), where 5.0 g soil was mixed (vortex) with 7.5 mL BuOH for 50 s. The solvent extract was separated by centrifugation at 3452 g for 60 min and analysed directly by HPLC.

Faecal excretion was calculated as the amount of B[a]P excreted in faeces divided by the dose given to each rat. Where the excreted amount in faeces was determined by the DCM/Ace extraction.

RB (relative bioavailability), calculated by equation 2.

BA (bioavailability), calculated by equation 3.

* Ageing effect is significant