

TABLE S1. Sterol concentrations in influent and effluent from STPs in TokyoParticulate Phase

Influent, $\mu\text{g/L}$	A	B	C	D	E	F	G	H	I	J
STP-1	90	324	6	632	26	109	39	276	6	11
STP-2	97	318	12	551	30	98	38	231	7	11
STP-3	80	285	5	559	23	98	39	239	5	10
STP-4	87	301	7	762	25	107	36	270	5	10

Effluent, $\mu\text{g/L}$

STP-1	0.58	1.73	0.13	3.25	0.80	0.75	2.54	1.97	0.51	0.12
STP-2	0.80	2.72	0.18	5.57	0.99	1.04	1.42	2.65	0.17	0.19
STP-3	0.68	2.28	0.17	5.43	0.83	1.09	2.35	2.85	0.49	0.15
STP-4	1.01	2.67	0.34	4.74	1.07	0.95	3.29	2.39	0.35	0.18

Dissolved Phase

Influent, $\mu\text{g/L}$	A	B	C	D	E	F	G	H	I	J
STP-1	1.52	3.80	0.05	16.82	0.60	2.41	1.16	5.74	0.17	0.19
STP-2	2.38	5.70	0.18	9.90	1.27	3.78	1.60	8.09	0.20	0.40
STP-3	1.90	5.03	0.08	10.54	0.95	3.65	1.57	8.08	0.14	0.35
STP-4	0.66	3.22	0.09	17.85	0.56	1.98	0.97	4.65	0.27	0.11

Effluent, $\mu\text{g/L}$

STP-1	0.013	0.028	0.002	0.178	0.015	0.018	0.155	0.053	0.028	0.003
STP-2	0.024	0.055	0.004	0.215	0.017	0.023	0.061	0.065	0.006	0.003
STP-3	0.019	0.045	0.004	0.202	0.014	0.024	0.097	0.068	0.016	0.003
STP-4	0.052	0.082	0.009	0.226	0.025	0.036	0.223	0.081	0.018	0.009

A: coprostanone, B: coprostanol, C: epicoprostanol, D: cholesterol, E: cholestanol, F: campesterol, G: stigmasterol, H: β -sitosterol, I: fucosterol, J: stigmastanol.

TABLE S2. Sterol concentrations in river waters from Malaysia and Vietnam (particulate phase)

Country	No.	Sampling site	Sterols (ng/L) ^a										%Cop ^b	Fecal bacteria (cell/100mL)		
			A	B	C	D	E	F	G	H	I	J		Total coliform	<i>E. coli</i>	Fecal streptococci
Malaysia	1	Sungai Pinang	1378	3543	205	6059	512	1033	1512	175	2767	174	20.4	1.9E+05	4.0E+04	-
	2	Prai River	33	16	2	1391	71	518	146	41	298	36	0.6	5.0E+00	<1e+0	-
	3	Pinang Estuary	2735	10340	191	15023	1119	1252	845	22	3954	227	29.0	>e+04	7.7E+04	-
	4	Nibong Tebal	19	75	8	575	48	223	912	33	362	54	3.2	4.9E+03	1.4E+03	-
	5	Teluk Intan	24	45	6	634	47	159	500	26	304	43	2.5	9.8E+03	4.7E+02	-
	6	Kuala Selangor	119	75	11	2116	321	1460	586	217	1230	257	1.2	9.7E+03	1.1E+03	-
	7	Gombak Headwater	31	7	0.9	395	22	89	152	26	374	36	0.6	3.4E+03	4.7E+02	-
	8	High Court	1572	7190	311	8939	959	1187	1273	135	3079	156	29.0	5.7E+05	1.4E+05	-
	9	Padang Balang Vill.	2833	11513	381	14909	1399	1983	1810	242	5112	312	28.4	2.2E+05	7.0E+04	-
	10	Port Klang	2410	7091	518	14413	2201	2194	7628	286	4887	308	16.9	8.1E+05	7.7E+04	-
	11	Malacca River	1355	6098	300	10104	1957	1744	2355	447	3923	855	20.9	9.6E+05	2.7E+05	-
	12	Muar River	34	16	1	1788	87	927	84	84	524	24	0.5	6.3E+03	8.0E+02	-
	13	Kim Kim River	128	351	15	1371	170	242	276	64	444	131	11.0	2.9E+04	1.8E+03	-
	14	Kim Kim Estuary	97	32	6	7919	235	727	188	220	1574	101	0.3	1.8E+03	2.0E+02	-
	15	Kim Kim Port	162	223	12	10603	545	1722	144	1126	24156	33	0.6	4.1E+04	2.7E+02	-
Vietnam ^c	16	AG-1	2	8	2	161	11	56	111	87	2	6	1.7	6.2E+03	1.0E+03	2.3E+03
	17	AG-2	23	46	9	889	80	342	633	571	15	52	1.7	2.5E+04	2.1E+03	3.0E+03
	18	AG-3	0.7	17	5	468	54	172	386	263	9	33	1.2	8.6E+03	2.0E+03	1.1E+03
	19	AG-4	1	45	15	1066	102	299	578	446	21	67	1.7	5.0E+03	3.0E+03	6.0E+02
	20	VL-1	2	16	4	357	42	92	217	176	6	30	1.7	9.6E+04	1.1E+03	1.0E+01
	21	VL-2	2	12	3	450	46	97	240	157	6	26	1.1	4.0E+04	6.0E+02	1.6E+02
	22	VL-3	1	126	43	1858	421	856	2026	1315	56	279	1.8	9.0E+03	2.3E+03	1.1E+02
	23	VL-4	2	232	29	1226	90	164	33	272	9	35	11.1	6.1E+04	2.1E+04	2.1E+04
	24	VL-5 ^d	0.4	0.2	0.1	191	6	17	18	38	0.7	0.8	0.1	2.4E+03	6.0E+01	1.2E+02
	25	VL-7	1	28	5	552	56	135	345	239	8	36	2.0	7.6E+03	2.2E+03	4.8E+02
	26	TV-1	0.8	10	2	301	32	81	172	147	5	27	1.3	7.7E+03	5.0E+02	<1e+1
	27	TV-2	34	657	196	2765	590	1186	2232	1904	71	582	6.4	7.1E+04	9.0E+03	1.0E+03
	28	TV-3*	24	229	108	7348	417	2306	5149	2639	201	374	1.2	7.5E+04	1.9E+04	6.6E+01
	29	TV-4*	0.3	0.05	0.02	42	0.6	0.07	0.1	0.1	0.09	0.03	0.1	1.6E+01	<1e+0	<1e+0
	30	TV-5*	0.4	0.05	0.01	34	0.01	0.03	0.02	0.2	0.1	0.02	0.1	<1e+0	<1e+0	<1e+0
	31	ST-1	17	55	14	541	115	174	448	356	13	95	3.0	3.6E+04	1.5E+03	2.6E+03
	32	ST-2	192	606	132	3350	798	1321	3359	2204	72	577	4.8	4.2E+04	3.8E+03	1.1E+04
	33	ST-3	373	968	193	3386	838	1546	3015	2122	65	660	7.3	1.2E+05	1.5E+04	1.5E+04
	34	ST-4*	0.02	0.02	0.005	58	0.7	0.6	0.6	2	0.03	0.4	0.0	1.0E+01	1.0E+00	3.0E+00
	35	ST-5*	3	1	0.1	263	26	47	92	97	76	9	0.2	6.7E+03	1.3E+02	4.2E+02
	36	ST-6*	0.04	0.02	0.02	67	2	0.9	2	8	0.5	1	0.0	6.0E+01	5.0E+00	8.2E+01
	37	CT-1	18	33	10	674	54	252	617	410	13	54	1.6	1.6E+04	2.7E+03	2.9E+03
	38	CT-2	6	12	3	482	29	125	319	214	7	28	0.9	1.1E+04	8.0E+02	3.5E+03
	39	CT-3	7	15	4	605	38	147	351	83	59	0.7	1.1	9.4E+03	1.5E+03	1.2E+03
	40	CT-4	5	11	3	661	33	137	308	206	7	32	0.8	6.3E+03	9.0E+02	1.0E+03
	41	CT-5	2483	8641	794	13263	1908	1005	885	2648	27	59	27.2	8.2E+06	1.1E+06	6.0E+03
	42	CT-6	5	13	4	323	30	99	309	199	10	32	1.3	7.0E+03	1.2E+03	2.0E+03
	43	CT-7	36	111	30	1015	94	303	910	582	27	59	3.5	3.6E+04	8.2E+03	8.0E+02
	44	CT-8*	2	2	1	199	5	4	6	8	0.4	0.9	0.8	4.0E+01	2.5E+01	1.0E+00
	45	CT-9	48	91	27	2288	130	699	1593	1253	51	132	1.4	3.0E+04	3.8E+03	2.0E+02
	46	CT-10*	0.7	0.04	0.02	192	11	10	21	17	0.7	2	0.0	1.8E+03	<1e+0	<1e+0
	47	CT-11	37	161	36	1649	174	2310	3601	4039	92	272	1.3	2.2E+05	1.1E+04	1.1E+03
	48	CT-12	35	116	17	804	111	235	693	453	21	46	4.6	1.6E+04	3.7E+03	4.8E+03
	49	CT-13	522	2155	264	2805	756	538	927	1082	28	220	23.2	9.9E+05	1.0E+05	1.0E+05
	50	CT-14	58	150	30	498	84	144	314	248	7	49	9.5	8.8E+04	9.0E+03	1.1E+03
	51	CT-15	262	708	120	3250	350	517	841	825	43	115	10.1	5.7E+04	2.0E+04	4.4E+03
	52	CT-16	228	602	83	1376	245	357	751	632	27	97	13.7	2.6E+05	2.0E+04	1.6E+03
	53	CT-17	124	318	53	956	154	245	507	451	19	74	11.0	1.1E+05	1.0E+04	1.3E+03
	54	CT-18	5471	13472	1579	18982	3485	3523	3753	6947	44	1434	23.0	3.8E+06	5.2E+05	8.8E+03
	55	CT-19	126	231	21	708	72	96	167	159	8	18	14.4	2.7E+05	3.9E+04	2.1E+03
	56	CT-21	308	555	85	1297	114	161	240	315	5	34	17.8	4.4E+05	1.5E+05	5.0E+04
	57	CT-22	372	851	187	2052	272	538	698	813.78	n.d.	n.d.	14.7	3.3E+05	2.1E+04	3.8E+03
	58	CT-23	1921	5435	802	6041	1586	1028	1379	2499	33	458	25.7	7.6E+05	1.1E+05	1.1E+04
	59	CT-20	15	45	6	520	64	157	355	249	13	39	3.1	3.0E+04	1.8E+03	2.0E+02

^a A: coprostanone, B: coprostanol, C: epicoprostanol, D: cholesterol, E: cholestanol, F: campesterol, G: stigmasterol, H: β -sitosterol, I: fucosterol, J: stigmasterol. ^b %Cop: B/sum(A - J) %.^c AG: An Giang Province, VL: Vinh Long Province, TV: Tra Vinh Province, ST: Soc Trang Province, CT: Can Tho Province. ^d * indicates ground water samples.

TABLE S3. Sterol concentrations in sediment from Malaysia and Vietnam

Country	No.	Sampling site	Sterols (ng/g-dry) ^a										%Cop ^b	C ^c	N ^d	C/N ^e
			A	B	C	D	E	F	G	H	I	J				
Malaysia	2	Prai River	76	70	29	501	762	601	570	913	95	493	1.70	15.7	1.2	13
	3	Pinang Estuary	7705	15497	2028	9397	11108	2547	2689	8337	321	337	25.84	24.5	1.5	17
	4	Nibong Tebal	125	207	103	732	1860	921	908	1165	151	1510	2.69	16.8	1.2	13
	5	Teluk Intan	8	37	14	1836	137	539	510	822	81	1172	0.71	32.5	0.6	55
	6	Kuala Selangor	327	205	92	1890	1483	1474	1485	2397	260	1459	1.85	23.4	1.2	19
	10	Port Klang	1288	1949	269	1617	1638	417	719	1719	34	1836	16.97	11.5	0.5	24
	11	Malacca River	1049	1401	221	1430	1584	1078	789	1466	153	748	14.12	15.8	1.2	13
	12	Muar River	154	208	46	1657	1367	1605	1067	2067	152	720	2.30	16.4	1.2	14
	13	Kim Kim River	464	637	62	871	446	383	481	903	199	126	13.93	6.6	0.3	25
	14	Kim Kim Estuary	399	78	33	1962	599	1416	1826	3775	493	947	0.67	23.7	0.6	37
Vietnam ^f	16	AG-1	72	71	43	535	341	517	877	1060	32	1010	1.56	5.9	0.3	22
	17	AG-2	750	567	345	1356	1020	1267	1425	2701	64	1186	5.31	7.6	0.3	22
	18	AG-3	37	53	21	335	341	244	373	484	8	332	2.37	2.0	0.1	21
	19	AG-4	385	760	180	628	845	576	942	1412	28	643	11.88	15.6	0.8	20
	20	VL-1	23	27	6	117	193	175	344	548	7	318	1.53	8.0	0.4	23
	21	VL-2	50	85	24	314	309	523	582	833	15	159	2.92	7.4	0.4	21
	22	VL-3	31	33	12	488	82	655	274	256	5	176	1.63	13.1	0.5	26
	23	VL-4	576	786	568	1077	1371	1561	2525	4807	79	2195	5.06	18.2	0.7	27
	25	VL-7	102	108	38	535	256	377	618	949	19	326	3.25	14.9	0.6	26
	26	TV-1	77	63	14	370	266	358	478	608	14	308	2.45	14.5	0.7	20
	27	TV-2	216	285	86	1716	669	796	1103	1503	31	913	3.90	4.9	0.2	23
	31	ST-1	14	12	4	63	114	102	192	340	4	368	1.03	10.9	0.6	20
	32	ST-2	143	181	50	648	632	516	770	1323	24	930	3.47	13.6	0.7	20
	33	ST-3	862	1315	544	2355	1868	1981	2528	3729	83	2815	7.28	19.9	1.1	18
	37	CT-1	234	271	118	1413	490	414	529	1353	36	431	5.12	40.3	1.0	39
	38	CT-2	123	110	39	560	284	540	801	1223	25	435	2.65	9.3	0.4	21
	39	CT-3	22	16	4	180	187	195	325	519	8	268	0.93	4.6	0.2	20
	40	CT-4	1	5	2	65	21	61	85	277	3	129	0.79	5.4	0.3	21
	41	CT-5	3143	4502	1030	3008	6352	2892	4218	8756	90	6873	11.02	81.5	3.1	26
	42	CT-6	92	100	30	447	430	455	796	1213	32	552	2.42	9.7	0.5	19
	43	CT-7	342	443	169	1380	520	923	1343	1781	49	593	5.88	12.3	0.5	25
	45	CT-9	453	647	179	824	1398	999	1771	2114	29	1446	6.56	15.8	0.8	19
	47	CT-11	667	729	227	4392	1210	4858	5641	10290	206	3431	2.30	14.2	0.6	24
	48	CT-12	320	343	116	1048	491	832	1384	1731	49	551	4.99	26.0	0.6	42
	49	CT-13	670	956	250	1489	802	945	1117	1815	42	750	10.82	12.6	0.4	35

^a A: coprostanone, B: coprostanol, C: epicoprostanol, D: cholesterol, E: cholestanol, F: campesterol, G: stigmasterol, H: β -sitosterol, I: fucosterol, J: stigmasterol. ^b%Cop: B/sum(A - J)%. ^cC: Organic carbon. ^dN: Organic nitrogen. ^eC/N: weight ratio. ^fAG: An Giang Province, VL: Vinh Long Province, TV: Tra Vinh Province, ST: Soc Trang Province, CT: Can Tho Province.