

5 調査結果及び考察

(1) 大気

大気中の臭素系ダイオキシン類の測定結果を表-36～39に、(塩素化)ダイオキシン類の測定結果を表-40及び41に、ポリ臭素化ジフェニルエーテルの結果を表-42及び43に示した。

表-36 臭素系(全臭素)ダイオキシン類測定結果(大気-1) 単位：pg/m³

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	0.005
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	0.031	0.091	0.060	0.29	0.20	0.12
PeBDDs総和	N.D.	N.D.	0.014	0.058	0.019	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.21	0.15	0.084	1.6	0.38	1.0
PeBDFs総和	0.23	0.12	0.059	0.38	0.38	1.0
HxBDFs総和	0.09	N.D.	N.D.	0.19	0.17	0.35
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	0.56	0.36	0.22	2.5	1.1	2.5

実測濃度が検出下限未満の場合は"N.D."で表示

表-37 臭素系(全臭素)ダイオキシン類測定結果(大気-2)

単位 : pg/m³

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	0.08
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	0.038	0.024	0.079	0.65	1.1	1.7
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.24	0.076	0.21	0.059	0.15	0.17
PeBDFs総和	0.25	0.13	0.21	0.11	0.20	0.24
HxBDFs総和	0.20	0.07	0.10	0.08	0.17	0.15
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.08
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	0.73	0.30	0.60	0.90	1.6	2.3

実測濃度が検出下限未満の場合は"N.D."で表示

表-38 臭素系(モノ臭素)ダイオキシン類測定結果(大気-1)

単位: pg/m³

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	0.027	0.014	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	0.06	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	0.006	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	0.005	N.D.	0.54	0.19	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	0.40	0.19	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	0.45	0.22	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	0.08	0.07	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	0.11	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	0.15	0.065	0.031
MoB-TeCDFs総和	N.D.	0.005	N.D.	0.16	0.096	0.026
MoB-PeCDFs総和	N.D.	N.D.	N.D.	0.098	0.048	0.013
MoB-HxCDFs総和	N.D.	N.D.	N.D.	0.06	0.04	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	0.010	N.D.	2.0	0.92	0.070

実測濃度が検出下限未満の場合は"N.D."で表示

表-39 臭素系(モノ臭素)ダイオキシン類測定結果(大気-2)

単位: pg/m³

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	0.02	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	0.14	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	0.025	N.D.	0.023	N.D.	N.D.	N.D.
MoB-TeCDDs総和	0.045	N.D.	0.031	N.D.	0.004	N.D.
MoB-PeCDDs総和	0.064	N.D.	0.045	N.D.	N.D.	0.007
MoB-HxCDDs総和	0.08	N.D.	0.01	N.D.	N.D.	N.D.
MoB-HpCDDs総和	0.24	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	0.032	N.D.	0.042	N.D.	N.D.	N.D.
MoB-TeCDFs総和	0.060	0.005	0.051	N.D.	0.007	N.D.
MoB-PeCDFs総和	0.099	0.008	0.019	N.D.	0.009	N.D.
MoB-HxCDFs総和	0.16	N.D.	0.04	N.D.	N.D.	N.D.
MoB-HpCDFs総和	0.18	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	0.99	0.013	0.26	N.D.	0.020	0.007

実測濃度が検出下限未満の場合は"N.D."で表示

表-40 (塩素化)ダイオキシン類測定結果(大気-1)

単位: pg/m³

分析項目		E地域			F地域		
		E1	E2	E3	F1	F2	F3
ダイオキシン	2,3,7,8-TeCDD	N.D.	(0.002)	N.D.	(0.003)	0.009	(0.003)
	1,3,6,8-TeCDD	0.037	0.099	0.028	0.24	0.22	0.31
	1,3,7,9-TeCDD	0.018	0.052	0.014	0.13	0.13	0.095
	1,2,3,7,8-PeCDD	N.D.	0.012	N.D.	0.012	0.031	0.011
	1,2,3,4,7,8-HxCDD	N.D.	(0.009)	N.D.	(0.012)	0.022	(0.010)
	1,2,3,6,7,8-HxCDD	N.D.	0.014	N.D.	0.019	0.035	0.017
	1,2,3,7,8,9-HxCDD	N.D.	0.009	N.D.	0.014	0.029	0.015
	1,2,3,4,6,7,8-HpCDD	0.015	0.070	0.012	0.10	0.16	0.11
	OCDD	0.031	0.071	0.025	0.15	0.25	0.27
ジベンゾフラン	2,3,7,8-TeCDF	0.008	0.026	0.010	0.023	0.052	0.019
	1,2,7,8-TeCDF	0.017	0.045	0.016	0.043	0.099	0.031
	1,2,3,7,8-PeCDF	0.013	0.062	0.014	0.061	0.14	0.046
	2,3,4,7,8-PeCDF	0.009	0.044	0.010	0.049	0.12	0.038
	1,2,3,4,7,8-HxCDF	0.012	0.055	0.011	0.054	0.12	0.047
	1,2,3,6,7,8-HxCDF	0.009	0.046	0.009	0.049	0.10	0.036
	1,2,3,7,8,9-HxCDF	N.D.	(0.003)	N.D.	(0.003)	0.007	(0.003)
	2,3,4,6,7,8-HxCDF	0.010	0.054	0.009	0.049	0.11	0.040
	1,2,3,4,6,7,8-HpCDF	0.026	0.18	0.024	0.13	0.28	0.12
	1,2,3,4,7,8,9-HpCDF	(0.004)	0.021	(0.004)	0.017	0.037	0.016
OCDF	(0.013)	0.070	0.016	0.069	0.16	0.079	
コブリンナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	0.011	0.027	0.009	0.023	0.038	0.017
	3,3',4,4'-TeCB(#77)	0.051	0.089	0.044	0.13	0.17	0.086
	3,3',4,4',5-PeCB(#126)	0.012	0.049	0.010	0.040	0.089	0.032
	3,3',4,4',5,5'-HxCB(#169)	(0.002)	0.012	(0.002)	0.012	0.025	0.008
	モノオルト						
	2',3,4,4',5-PeCB(#123)	0.010	0.011	0.006	0.026	0.023	0.013
	2,3',4,4',5-PeCB(#118)	0.35	0.17	0.25	0.97	0.41	0.33
	2,3,3',4,4',5-PeCB(#105)	0.12	0.081	0.083	0.32	0.18	0.14
	2,3,4,4',5-PeCB(#114)	0.015	0.015	0.007	0.033	0.024	0.017
	2,3',4,4',5,5'-HxCB(#167)	0.008	0.011	(0.006)	0.031	0.027	0.013
	2,3,3',4,4',5-HxCB(#156)	0.021	0.030	0.017	0.065	0.065	0.029
	2,3,3',4,4',5'-HxCB(#157)	0.006	0.015	(0.004)	0.022	0.031	0.012
2,3,3',4,4',5,5'-HpCB(#189)	(0.004)	0.016	(0.004)	0.021	0.037	0.013	
TEQ(PCDDs+PCDFs) (pg-TEQ/m ³)	0.011	0.063	0.011	0.067	0.16	0.056	
TEQ(Co-PCBs) (pg-TEQ/m ³)	0.0013	0.0051	0.0011	0.0043	0.0093	0.0034	
TEQ総和(pg-TEQ/m ³)	0.012	0.069	0.012	0.072	0.17	0.060	
同族体	ダイオキシン						
	TeCDDs総和	0.037	0.101	0.028	0.24	0.22	0.31
	PeCDDs総和	0.043	0.25	0.042	0.44	0.63	0.24
	HxCDDs総和	0.034	0.22	0.035	0.52	0.65	0.29
	HpCDDs総和	0.033	0.15	0.027	0.24	0.36	0.25
	OCDD	0.031	0.071	0.025	0.15	0.25	0.27
	PCDDs総和	0.226	0.971	0.189	1.89	2.54	1.55
	ジベンゾフラン						
	TeCDFs総和	0.38	1.1	0.33	1.0	2.3	0.76
	PeCDFs総和	0.18	0.75	0.16	0.75	1.8	0.59
	HxCDFs総和	0.087	0.48	0.082	0.46	1.0	0.38
HpCDFs総和	0.040	0.27	0.040	0.21	0.44	0.19	
OCDF	0.013	0.070	0.016	0.069	0.16	0.079	
PCDFs総和	0.70	2.67	0.628	2.489	5.7	1.999	
(PCDDs+PCDFs)総和	0.93	3.6	0.82	4.4	8.2	3.5	

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-41 (塩素化)ダイオキシン類測定結果(大気-2)

単位: pg/m³

分析項目		G地域			H地域		
		G1	G2	G3	H1	H2	H3
ダイオキシン	2,3,7,8-TeCDD	(0.003)	(0.001)	(0.002)	(0.0013)	0.0023	(0.0018)
	1,3,6,8-TeCDD	0.077	0.11	0.14	0.14	0.13	0.087
	1,3,7,9-TeCDD	0.047	0.068	0.087	0.053	0.046	0.042
	1,2,3,7,8-PeCDD	0.015	0.008	0.008	0.0048	0.0092	0.0066
	1,2,3,4,7,8-HxCDD	0.019	(0.009)	(0.008)	0.006	0.009	0.007
	1,2,3,6,7,8-HxCDD	0.038	0.016	0.012	0.010	0.019	0.011
	1,2,3,7,8,9-HxCDD	0.031	0.013	0.010	0.0093	0.013	0.010
	1,2,3,4,6,7,8-HpCDD	0.38	0.086	0.074	0.085	0.13	0.098
	OCDD	1.2	0.17	0.14	0.25	0.34	0.33
ジベンゾフラン	2,3,7,8-TeCDF	0.018	0.018	0.019	0.012	0.019	0.016
	1,2,7,8-TeCDF	0.023	0.029	0.031	0.021	0.027	0.027
	1,2,3,7,8-PeCDF	0.059	0.045	0.048	0.027	0.046	0.033
	2,3,4,7,8-PeCDF	0.050	0.038	0.043	0.023	0.039	0.027
	1,2,3,4,7,8-HxCDF	0.12	0.050	0.054	0.034	0.054	0.040
	1,2,3,6,7,8-HxCDF	0.11	0.043	0.044	0.029	0.044	0.032
	1,2,3,7,8,9-HxCDF	0.008	(0.003)	(0.003)	0.0021	0.0025	0.0026
	2,3,4,6,7,8-HxCDF	0.15	0.047	0.046	0.031	0.050	0.030
	1,2,3,4,6,7,8-HpCDF	0.80	0.16	0.15	0.11	0.16	0.12
	1,2,3,4,7,8,9-HpCDF	0.11	0.018	0.019	0.015	0.019	0.018
OCDF	0.93	0.12	0.13	0.052	0.079	0.070	
コブリンナールPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	0.017	0.026	0.018	0.014	0.028	0.019
	3,3',4,4'-TeCB(#77)	0.058	0.12	0.088	0.083	0.22	0.13
	3,3',4,4',5-PeCB(#126)	0.026	0.045	0.030	0.020	0.039	0.026
	3,3',4,4',5,5'-HxCB(#169)	0.011	0.011	0.008	0.0048	0.0093	0.0060
	モノオルト						
	2',3,4,4',5-PeCB(#123)	0.009	0.018	0.011	0.014	0.038	0.023
	2,3',4,4',5-PeCB(#118)	0.22	0.66	0.33	0.40	1.3	0.77
	2,3,3',4,4'-PeCB(#105)	0.087	0.26	0.12	0.14	0.52	0.26
	2,3,4,4',5-PeCB(#114)	0.014	0.029	0.017	0.018	0.059	0.030
	2,3',4,4',5,5'-HxCB(#167)	0.011	0.041	0.039	0.013	0.026	0.020
	2,3,3',4,4',5-HxCB(#156)	0.030	0.11	0.089	0.025	0.056	0.041
	2,3,3',4,4',5'-HxCB(#157)	0.009	0.026	0.018	0.0085	0.019	0.013
2,3,3',4,4',5,5'-HpCB(#189)	0.017	0.026	0.023	0.007	0.013	0.010	
TEQ(PCDDs+PCDFs) (pg-TEQ/m ³)		0.11	0.053	0.056	0.034	0.057	0.041
TEQ(Co-PCBs) (pg-TEQ/m ³)		0.0028	0.0048	0.0032	0.0021	0.0043	0.0028
TEQ総和(pg-TEQ/m ³)		0.11	0.058	0.059	0.037	0.062	0.044
同族体	ダイオキシン						
	TeCDDs総和	0.22	0.27	0.34	0.25	0.25	0.20
	PeCDDs総和	0.30	0.26	0.25	0.12	0.24	0.15
	HxCDDs総和	0.53	0.28	0.28	0.17	0.25	0.18
	HpCDDs総和	0.82	0.20	0.18	0.17	0.26	0.21
	OCDD	1.2	0.17	0.14	0.25	0.34	0.33
	PCDDs総和	3.07	1.18	1.19	0.96	1.34	1.07
	ジベンゾフラン						
	TeCDFs総和	0.61	0.74	0.77	0.51	0.82	0.65
	PeCDFs総和	0.76	0.57	0.61	0.35	0.64	0.44
	HxCDFs総和	1.1	0.42	0.43	0.28	0.44	0.31
	HpCDFs総和	1.3	0.24	0.23	0.17	0.24	0.19
	OCDF	0.93	0.12	0.13	0.052	0.079	0.070
	PCDFs総和	4.7	2.09	2.17	1.362	2.219	1.66
(PCDDs+PCDFs)総和		7.8	3.3	3.4	2.3	3.6	2.7

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-42 ポリ臭素化ジフェニルエーテル測定結果(大気-1)

単位: ng/m³

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
4-MoBDE(#3)	N.D.	N.D.	0.0001	0.00012	0.00011	0.00008
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	0.00005	N.D.	N.D.
4,4'-DiBDE(#15)	0.00007	0.00005	0.00007	0.00014	0.00007	0.00006
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	0.00011	N.D.	0.00008
2,4,4'-TrBDE(#28)	0.00009	0.00007	0.00009	0.00022	N.D.	0.00014
2,3',4',6-TeBDE(#71)	N.D.	0.00006	N.D.	0.00018	0.00014	0.00019
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.00027	0.00045	0.00029	0.00090	0.00062	0.00075
2,3',4,4'-TeBDE(#66)	N.D.	N.D.	N.D.	0.00018	0.00011	0.00019
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	N.D.	0.00010	N.D.	0.00008	N.D.	N.D.
2,3',4,4',6-PeBDE(#119)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5-PeBDE(#99)	0.00017	0.00055	0.00016	0.00058	0.00045	0.00062
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	N.D.	N.D.	0.00011	0.00010	0.00012
2,2',4,4',5,5'-HxBDE(#153)	N.D.	0.00008	N.D.	0.00014	0.00012	0.00014
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	N.D.	N.D.	0.00015	0.00013	0.00019
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	N.D.	N.D.	N.D.	0.00010	0.00009	0.00010
2,2',3,4,4',5,5',6-OcBDE(#203)	N.D.	N.D.	N.D.	0.00009	0.00011	0.00010
2,2',3,3',4,4',5,6'-OcBDE(#196)	N.D.	N.D.	N.D.	0.00009	0.00011	0.00009
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	0.0003	0.00014	0.0002	0.00034	0.00034	0.00034
2,2',3,3',4,4',5,5',6-NoBDE(#206)	0.0003	0.00007	N.D.	0.00023	0.00029	0.00020
DeBDE(#209)	0.0054	0.0020	0.0039	0.0042	0.0057	0.0041
MoBDEs 総和	N.D.	N.D.	0.0001	0.00012	0.00011	0.00008
DiBDEs 総和	0.00007	0.00016	0.00007	0.00041	0.00021	0.00019
TrBDEs 総和	0.00009	0.00007	0.00009	0.00033	N.D.	0.00022
TeBDEs 総和	0.00027	0.00051	0.00029	0.0013	0.00087	0.0011
PeBDEs 総和	0.00017	0.00065	0.00016	0.00087	0.00045	0.00062
HxBDEs 総和	N.D.	0.00008	N.D.	0.00025	0.00031	0.00053
HpBDEs 総和	N.D.	N.D.	N.D.	0.00024	0.00021	0.00033
OcBDEs 総和	N.D.	N.D.	N.D.	0.00046	0.00043	0.00052
NoBDEs 総和	0.0008	0.00031	0.0002	0.00085	0.00089	0.00078
DeBDE	0.0054	0.0020	0.0039	0.0042	0.0057	0.0041
PBDEs 総和	0.0068	0.0038	0.0048	0.0090	0.0092	0.0085

実測濃度が検出下限未満の場合は"N.D."で表示

表-43 ポリ臭素化ジフェニルエーテル測定結果(大気-2)

単位: ng/m³

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
4-MoBDE(#3)	0.00010	0.0001	0.0001	N.D.	0.0002	0.0002
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	0.00008	0.00017	0.00010	0.00009	0.00013	0.00010
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	N.D.	N.D.	0.00010
2,4,4'-TrBDE(#28)	0.00010	0.00021	0.00015	0.00008	0.00022	0.00015
2,3',4',6-TeBDE(#71)	0.00007	0.00008	0.00011	N.D.	0.00012	0.00010
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.00034	0.00035	0.00032	0.00018	0.00054	0.00037
2,3',4,4'-TeBDE(#66)	0.00006	N.D.	N.D.	N.D.	0.00010	0.00008
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3',4,4',6-PeBDE(#119)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5-PeBDE(#99)	0.00026	0.00031	0.00031	0.00010	0.00030	0.00022
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,5'-HxBDE(#153)	0.00008	N.D.	0.0002	N.D.	N.D.	N.D.
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	0.00013	N.D.	0.0001	N.D.	0.0002	0.0001
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	0.00013	N.D.	N.D.	N.D.	0.0001	0.0001
2,2',3,4,4',5,5',6-OcBDE(#203)	0.00013	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6'-OcBDE(#196)	0.00013	N.D.	0.0001	N.D.	0.0001	0.0001
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	0.00059	0.0004	0.0006	0.0005	0.0007	0.0006
2,2',3,3',4,4',5,5',6-NoBDE(#206)	0.00048	0.0003	0.0006	0.0003	0.0006	0.0004
DeBDE(#209)	0.0095	0.0065	0.016	0.0043	0.013	0.0060
MoBDEs 総和	0.00010	0.0001	0.0001	N.D.	0.0002	0.0002
DiBDEs 総和	0.00021	0.00025	0.00019	0.00017	0.00038	0.00032
TrBDEs 総和	0.00010	0.00021	0.00015	0.00008	0.00022	0.00025
TeBDEs 総和	0.00047	0.00043	0.00043	0.00018	0.00076	0.00055
PeBDEs 総和	0.00026	0.00031	0.00041	0.00010	0.00030	0.00022
HxBDEs 総和	0.00008	N.D.	0.0002	N.D.	N.D.	N.D.
HpBDEs 総和	0.00021	N.D.	0.0001	N.D.	0.0002	0.0001
OcBDEs 総和	0.00055	N.D.	0.0001	N.D.	0.0002	0.0002
NoBDEs 総和	0.0016	0.0009	0.0016	0.0011	0.0018	0.0014
DeBDE	0.0095	0.0065	0.016	0.0043	0.013	0.0060
PBDEs 総和	0.013	0.0087	0.019	0.0059	0.017	0.0092

実測濃度が検出下限未満の場合は"N.D."で表示

まとめ及び考察

ポリ臭素化ダイオキシン類は、同族体の総和で0.22～2.5 pg/m³(平均値1.1 pg/m³)の範囲で検出され、F1及びF3地点が最も高い濃度を示した。地域別ではF地域が最も高く(表-44)、地点種類別では市街・住宅地域が最も高かった(表-45)。同族体は、TeBDDs、TeBDFs、PeBDFs及びHxBDFsが主成分であり、H地域では他に比べてTeBDDsの割合が高い同族体組成を示した(図-26)。2,3,7,8-異性体では、F3地点から2,3,7,8-TeBDF検出され、更にH3地点では1,2,3,4,6,7,8-HpBDFが検出された。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/11～1/1.2であった。モノ臭素ポリ塩素化ダイオキシン類同族体総和とポリ臭素化ダイオキシン類同族体総和の相関係数は0.3718であった(図-28)。

モノ臭素ポリ塩素化ダイオキシン類は、同族体の総和でN.D.～2.0 pg/m³(平均値0.36 pg/m³)の範囲で検出され、F1地点が最も高い濃度を示した。地域別ではF地域が最も高く(表-44)、地点種類別では焼却施設周辺地域が最も高かった(表-45)。同族体は、全体的にMoB-TrCDDs/DFs、MoB-TeCDDs/DFs及びMoB-PeCDDs/DFsの割合がやや高い傾向がみられたが、G1地点ではMoB-HxCDDs/DFs及びMoB-HpCDDsの割合が高く他とは異なった同族体組成を示した(図-25)。2,3,7,8-異性体では、F1地点から2-MoB-3,7,8-TrCDD及び1-MoB-2,3,4,6,7,8,9-HpCDDが、F2地点から2-MoB-3,7,8-TrCDD及び3-MoB-2,7,8-TrCDFが、G1地点から1-MoB-2,3,6,7,8,9-HxCDD及び1-MoB-2,3,4,6,7,8,9-HpCDDが検出された。検出されたモノ臭素ポリ塩素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/390～1/2であった。

(塩素化)ダイオキシン類は、0.012～0.17 pg-TEQ/m³(平均値0.064 pg-TEQ/m³)の範囲で検出され、F2地点が最も高い濃度を示した。地域別ではF地域が最も高く(表-44)、地点種類別では焼却施設周辺地域が最も高かった(表-45)。モノ臭素ポリ塩素化ダイオキシン類同族体総和と塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の相関係数は0.5994であった(図-29)。

ポリ臭素化ジフェニルエーテルは、同族体の総和で0.0038～0.019 ng/m³(平均値0.0096 ng/m³)の範囲で検出され、G3地点が最も高い濃度を示した。地域別ではG地域が最も高く(表-44)、地点種類別では工業地域が最も高かった(表-45)。同族体組成は、全ての地点でDeBDEが主成分であった(図-27)。ポリ臭素化ダイオキシン類同族体総和及びモノ臭素ポリ塩素化ダイオキシン類同族体総和との相関係数はそれぞれ0.1446及び0.1356であった(図-30及び31)。

表-44 地域別総括表(大気)

	E地域	F地域	G地域	H地域	全地域
PBDDs/DFs 総和 (pg/m ³)	0.38 (0.22~0.56)	2.0 (1.1~2.5)	0.54 (0.30~0.73)	1.6 (0.90~2.3)	1.1 (0.22~2.5)
MoBPCDDs/DFs 総和 (pg/m ³)	0.0033 (N.D.~0.01)	1.0 (0.07~2.0)	0.42 (0.013~0.99)	0.0090 (N.D.~0.02)	0.36 (N.D.~2.0)
DXNs TEQ (pg-TEQ/m ³)	0.031 (0.012~0.069)	0.10 (0.060~0.17)	0.076 (0.058~0.11)	0.048 (0.037~0.062)	0.064 (0.012~0.17)
PBDEs 総和 (ng/m ³)	0.0051 (0.0038~0.0068)	0.0089 (0.0085~0.0092)	0.014 (0.0087~0.019)	0.011 (0.0059~0.017)	0.0096 (0.0038~0.019)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

表-45 地点種類別総括表(大気)

	市街・住宅地域	工業地域	焼却施設 周辺地域	全地域
PBDDs/DFs 総和 (pg/m ³)	1.6 (0.56~2.5)	0.37 (0.22~0.60)	0.73 (0.36~1.1)	1.1 (0.22~2.5)
MoBPCDDs/DFs 総和 (pg/m ³)	0.44 (N.D.~2.0)	0.091 (N.D.~0.26)	0.47 (0.01~0.92)	0.36 (N.D.~2.0)
DXNs TEQ (pg-TEQ/m ³)	0.057 (0.012~0.11)	0.043 (0.012~0.059)	0.12 (0.069~0.17)	0.064 (0.012~0.17)
PBDEs 総和 (ng/m ³)	0.0099 (0.0059~0.017)	0.011 (0.0048~0.019)	0.0065 (0.0038~0.0092)	0.0096 (0.0038~0.019)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

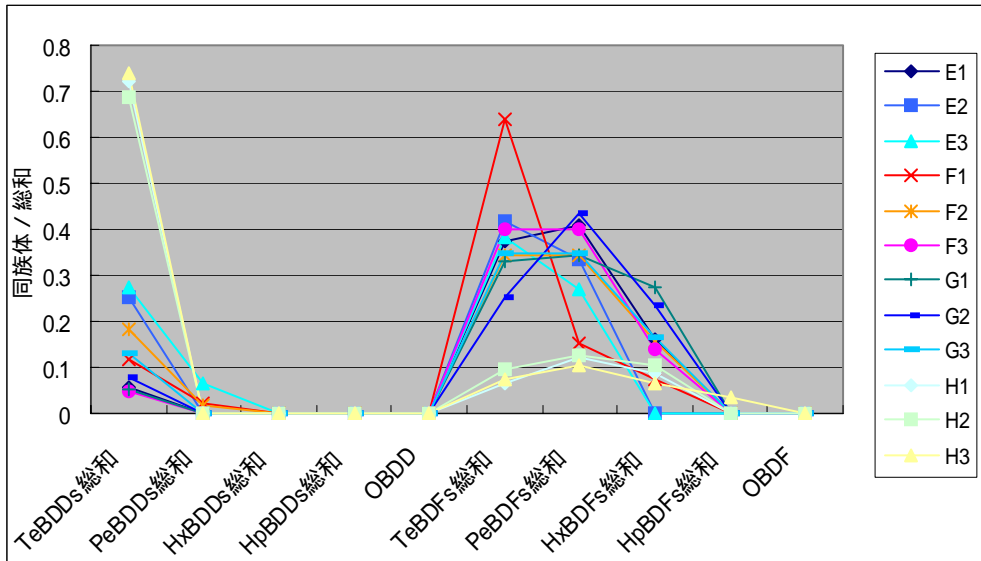


図-25 ポリ臭素化ダイオキシン類同族体分布(大気)

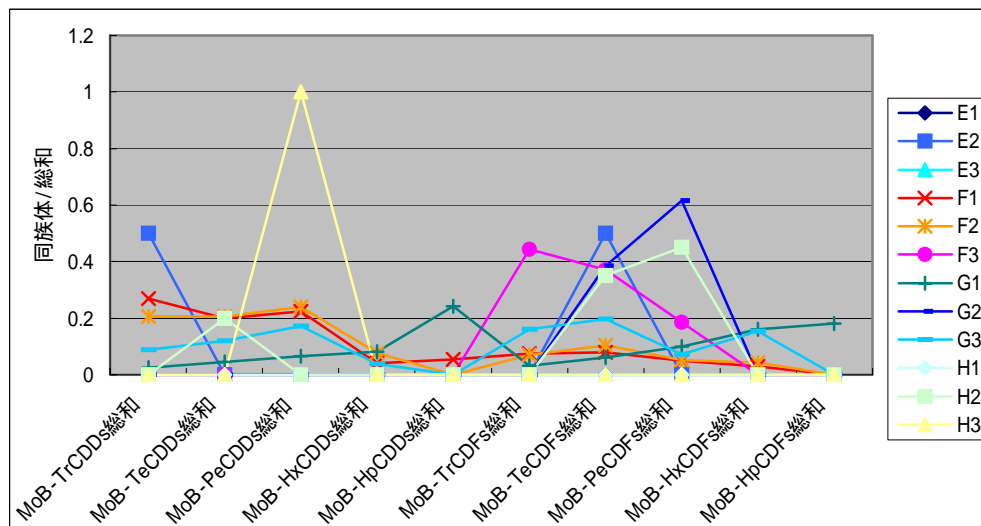


図-26 モノ臭素ポリ塩素化ダイオキシン類同族体分布(大気)

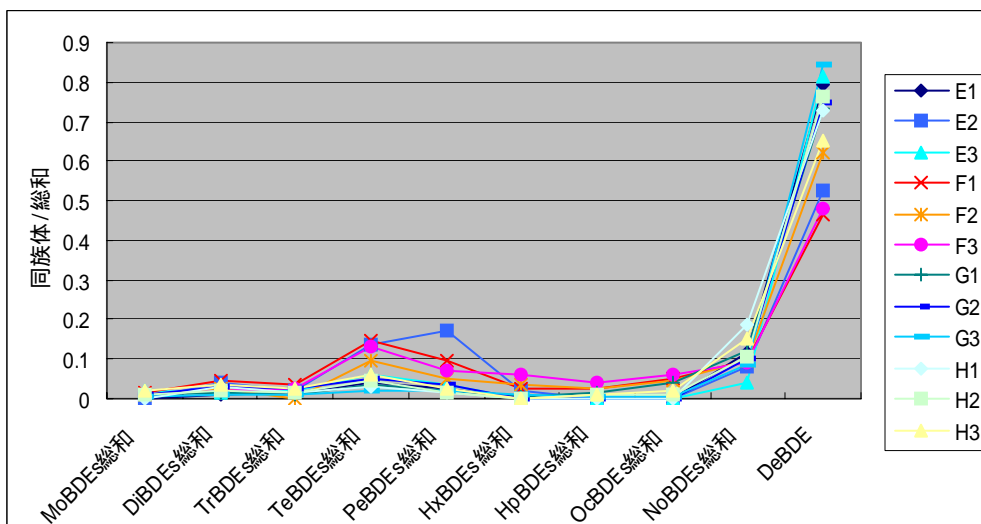


図-27 ポリ臭素化ジフェニルエーテル同族体分布(大気)

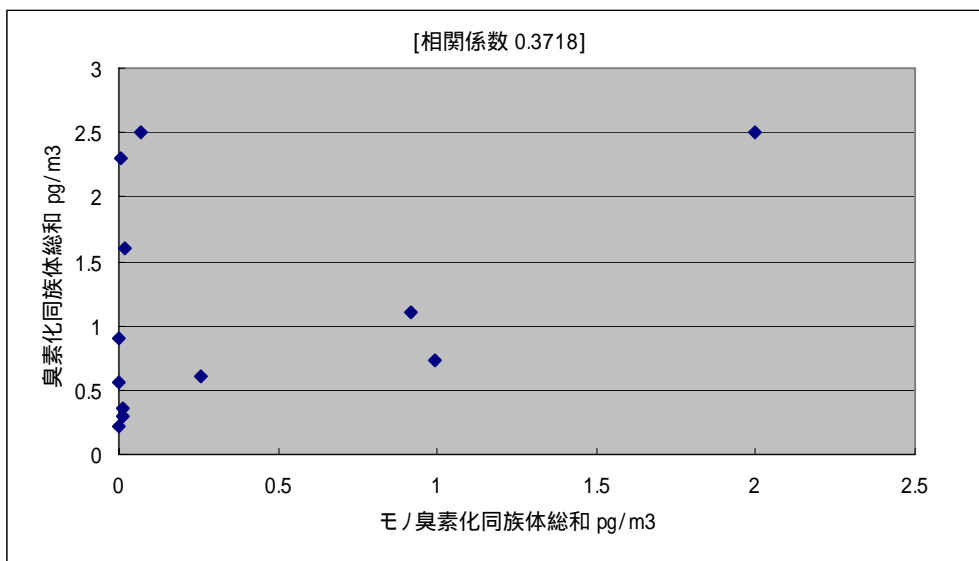


図-28 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ダイオキシン類同族体総和の相関(大気)

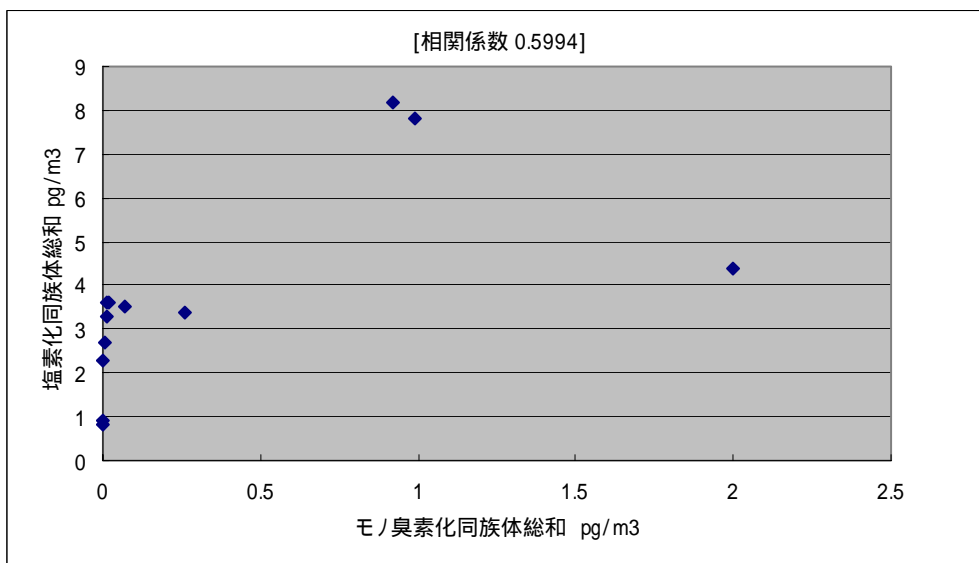


図-29 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
(塩素化)ダイオキシン類同族体総和の相関(大気)

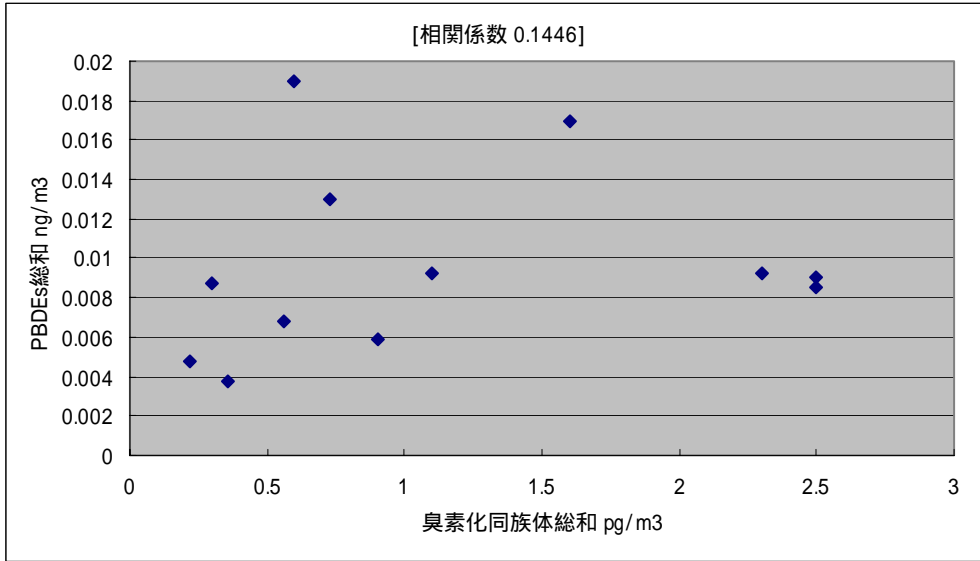


図-30 ポリ臭素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(大気)

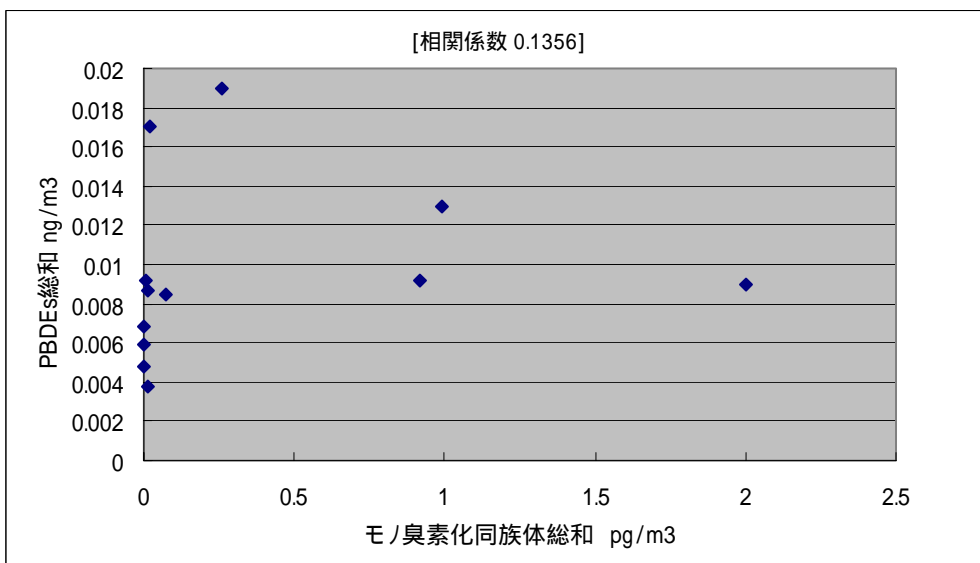


図-31 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(大気)

(2) 降下ばいじん

降下ばいじん中の臭素系ダイオキシン類の測定結果を表-46～49に、(塩素化)ダイオキシン類の測定結果を表-50及び51に、ポリ臭素化ジフェニルエーテルの結果を表-52及び53に示した。

表-46 臭素系(全臭素)ダイオキシン類測定結果(降下ばいじん-1) 単位：pg/m²/day

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	N.D.	N.D.	N.D.	5	3	N.D.
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	24	23	16	75	82	19
PeBDFs総和	39	27	13	62	49	13
HxBDFs総和	30	N.D.	N.D.	30	N.D.	N.D.
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	93	50	29	170	130	32

実測濃度が検出下限未満の場合は"N.D."で表示

表-47 臭素系(全臭素)ダイオキシン類測定結果(降下ばいじん-2) 単位: pg/m²/day

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	3	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	110	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	N.D.	N.D.	3	44	44	77
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	23	7	42	28	47	14
PeBDFs総和	21	15	35	28	97	28
HxBDFs総和	N.D.	N.D.	30	N.D.	180	20
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	110	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	44	22	110	100	480	140

実測濃度が検出下限未満の場合は"N.D."で表示

表-48 臭素系(モノ臭素)ダイオキシン類測定結果(降下ばいじん-1) 単位: pg/m²/day

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	3	3	N.D.
MoB-TeCDDs総和	N.D.	3	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	15	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	18	N.D.	3	3	N.D.

実測濃度が検出下限未満の場合は"N.D."で表示

表-49 臭素系(モノ臭素)ダイオキシン類測定結果(降下ばいじん-2) 単位: pg/m²/day

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	2	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	3
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	2
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	4
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	9	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	3	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	12	N.D.	N.D.	9

実測濃度が検出下限未満の場合は"N.D."で表示

表-50 (塩素化)ダイオキシン類測定結果(降下ばいじん-1) 単位: pg/m²/day

分析項目		E地域			F地域		
		E1	E2	E3	F1	F2	F3
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,3,6,8-TeCDD	(10)	24	(9)	19	25	60
	1,3,7,9-TeCDD	5	12	(4)	8	10	15
	1,2,3,7,8-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,7,8-HxCDD	(7)	(7)	N.D.	N.D.	(12)	(10)
	1,2,3,6,7,8-HxCDD	(3)	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,6,7,8-HpCDD	38	34	19	20	34	22
	OCDD	1100	280	170	270	380	390
ジベンゾフラン	2,3,7,8-TeCDF	N.D.	(4)	N.D.	(3)	(3)	N.D.
	1,2,7,8-TeCDF	(4)	6	N.D.	(4)	7	(3)
	1,2,3,7,8-PeCDF	(5)	7	(3)	6	7	(3)
	2,3,4,7,8-PeCDF	(4)	5	N.D.	5	5	(2)
	1,2,3,4,7,8-HxCDF	6	5	(3)	5	6	(3)
	1,2,3,6,7,8-HxCDF	(4)	(4)	(2)	(4)	(4)	(2)
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3,4,6,7,8-HxCDF	(5)	(4)	(3)	(5)	(4)	N.D.
	1,2,3,4,6,7,8-HpCDF	16	14	(9)	14	13	(10)
	1,2,3,4,7,8,9-HpCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OCDF	(13)	(10)	(10)	(10)	N.D.	N.D.	
コブリンナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	N.D.	6	N.D.	N.D.	N.D.	N.D.
	3,3',4,4'-TeCB(#77)	36	47	(18)	31	30	34
	3,3',4,4',5-PeCB(#126)	(5)	(7)	N.D.	N.D.	(6)	(6)
	3,3',4,4',5,5'-HxCB(#169)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	モノオルト						
	2',3,4,4',5-PeCB(#123)	6	7	(4)	(6)	(3)	7
	2,3',4,4',5-PeCB(#118)	250	240	130	240	120	320
	2,3,3',4,4',5-PeCB(#105)	110	110	52	93	51	130
	2,3,4,4',5-PeCB(#114)	(7)	11	(4)	(8)	N.D.	10
	2,3',4,4',5,5'-HxCB(#167)	(8)	(6)	(4)	(9)	(4)	10
	2,3,3',4,4',5-HxCB(#156)	21	15	11	22	11	28
	2,3,3',4,4',5'-HxCB(#157)	(5)	(5)	(4)	(5)	(3)	(7)
2,3,3',4,4',5,5'-HpCB(#189)	N.D.	N.D.	(4)	(5)	N.D.	N.D.	
TEQ(PCDDs+PCDFs) (pg-TEQ/m ² /day)		1.3	3.9	0.21	3.7	4.0	0.26
TEQ(Co-PCBs) (pg-TEQ/m ² /day)		0.051	0.054	0.024	0.047	0.026	0.068
TEQ総和(pg-TEQ/m ² /day)		1.3	3.9	0.23	3.7	4.0	0.33
同族体	ダイオキシン						
	TeCDDs総和	17	44	13	30	46	79
	PeCDDs総和	22	22	N.D.	19	26	15
	HxCDDs総和	47	35	15	28	48	37
	HpCDDs総和	82	71	43	49	80	52
	OCDD	1100	280	170	270	380	390
	PCDDs総和	1268	452	241	396	580	573
	ジベンゾフラン						
	TeCDFs総和	75	160	18	85	140	76
	PeCDFs総和	52	66	12	56	78	31
	HxCDFs総和	39	35	19	34	39	18
	HpCDFs総和	26	14	9	14	13	10
	OCDF	13	10	10	10	N.D.	N.D.
	PCDFs総和	205	285	68	199	270	135
(PCDDs+PCDFs)総和		1500	740	310	600	850	710

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-51 (塩素化)ダイオキシン類測定結果(降下ばいじん-2) 単位: pg/m²/day

分析項目		G地域			H地域		
		G1	G2	G3	H1	H2	H3
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,3,6,8-TeCDD	20	20	29	40	33	38
	1,3,7,9-TeCDD	10	8	16	11	12	18
	1,2,3,7,8-PeCDD	N.D.	N.D.	N.D.	(1.5)	(1.6)	(2)
	1,2,3,4,7,8-HxCDD	N.D.	(8)	N.D.	N.D.	N.D.	(3)
	1,2,3,6,7,8-HxCDD	N.D.	N.D.	N.D.	(3)	N.D.	(4)
	1,2,3,7,8,9-HxCDD	N.D.	N.D.	N.D.	2.6	(1.6)	3.3
	1,2,3,4,6,7,8-HpCDD	15	36	14	13	19	29
	OCDD	110	870	120	91	130	200
ジベンゾフラン	2,3,7,8-TeCDF	N.D.	(5)	(7)	(3)	(3)	5
	1,2,7,8-TeCDF	(4)	6	9	3.4	3.9	6.3
	1,2,3,7,8-PeCDF	(3)	7	(5)	4.8	5.7	7.2
	2,3,4,7,8-PeCDF	(2)	6	(4)	4.0	4.8	6.0
	1,2,3,4,7,8-HxCDF	(3)	9	5	3.8	6.0	7.3
	1,2,3,6,7,8-HxCDF	(3)	5	(4)	3.7	4.4	6.4
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3,4,6,7,8-HxCDF	N.D.	(5)	N.D.	4	4	5
	1,2,3,4,6,7,8-HpCDF	12	19	(11)	10	16	21
	1,2,3,4,7,8,9-HpCDF	N.D.	N.D.	N.D.	(2)	(2)	(3)
OCDF	(9)	(12)	(11)	(8)	12	13	
コブジナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	N.D.	6	6	(1.9)	4.6	5.2
	3,3',4,4'-TeCB(#77)	20	100	59	22	60	50
	3,3',4,4',5-PeCB(#126)	(4)	25	(7)	4	7	8
	3,3',4,4',5,5'-HxCB(#169)	N.D.	(4)	N.D.	(1.1)	N.D.	(1.7)
	モノオルト						
	2',3,4,4',5-PeCB(#123)	N.D.	22	6	3	8	6
	2,3',4,4',5-PeCB(#118)	(90)	1200	240	80	270	200
	2,3,3',4,4',5-PeCB(#105)	41	520	110	39	140	94
	2,3,4,4',5-PeCB(#114)	(5)	27	(7)	(3)	11	8
	2,3',4,4',5,5'-HxCB(#167)	(4)	110	11	(4)	8	10
	2,3,3',4,4',5-HxCB(#156)	(10)	260	29	7	20	22
	2,3,3',4,4',5'-HxCB(#157)	N.D.	52	(6)	(2)	6	7
	2,3,3',4,4',5,5'-HpCB(#189)	N.D.	48	N.D.	N.D.	(3)	(3)
TEQ(PCDDs+PCDFs) (pg-TEQ/m ² /day)	0.28	5.4	0.65	3.9	4.5	6.6	
TEQ(Co-PCBs) (pg-TEQ/m ² /day)	0.0061	2.9	0.057	0.42	0.77	0.85	
TEQ総和(pg-TEQ/m ² /day)	0.29	8.2	0.71	4.3	5.3	7.4	
同族体	ダイオキシン						
	TeCDDs総和	36	28	54	56	54	77
	PeCDDs総和	22	17	25	19	27	47
	HxCDDs総和	21	41	20	20	23	64
	HpCDDs総和	32	83	30	28	43	62
	OCDD	110	870	120	91	130	200
	PCDDs総和	221	1039	249	214	277	450
	ジベンゾフラン						
	TeCDFs総和	68	93	160	71	88	140
	PeCDFs総和	36	51	54	55	67	89
	HxCDFs総和	18	41	24	33	41	57
	HpCDFs総和	12	19	11	17	26	34
	OCDF	9	12	11	8	12	13
	PCDFs総和	143	216	260	184	234	333
(PCDDs+PCDFs)総和	360	1300	510	400	510	780	

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-52 ポリ臭素化ジフェニルエーテル測定結果(降下ばいじん-1) 単位：ng/m²/day

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	N.D.	0.08	N.D.	0.07	0.05	0.09
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4,4'-TrBDE(#28)	N.D.	0.08	N.D.	0.09	0.07	0.12
2,3',4',6-TeBDE(#71)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.15	0.16	0.12	0.14	0.15	0.18
2,3',4,4'-TeBDE(#66)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3',4,4',6-PeBDE(#119)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5-PeBDE(#99)	0.23	0.08	0.21	0.07	0.07	0.05
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,5'-HxBDE(#153)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	N.D.	N.D.	N.D.	0.1	N.D.
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5,5',6-OcBDE(#203)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6'-OcBDE(#196)	N.D.	N.D.	N.D.	N.D.	0.1	N.D.
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	2.1	0.32	0.2	0.2	0.3	0.7
2,2',3,3',4,4',5,5',6-NoBDE(#206)	2.6	0.49	0.2	N.D.	0.2	0.8
DeBDE(#209)	86	12	4.9	3.4	9.7	28
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	N.D.	0.08	N.D.	0.07	0.05	0.09
TrBDEs 総和	N.D.	0.08	N.D.	0.09	0.07	0.12
TeBDEs 総和	0.15	0.16	0.12	0.14	0.15	0.18
PeBDEs 総和	0.23	0.08	0.21	0.07	0.07	0.05
HxBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDEs 総和	N.D.	N.D.	N.D.	N.D.	0.1	N.D.
OcBDEs 総和	N.D.	N.D.	N.D.	N.D.	0.1	N.D.
NoBDEs 総和	4.7	0.81	0.4	0.3	0.6	1.9
DeBDE	86	12	4.9	3.4	9.7	28
PBDEs 総和	91	13	5.6	4.1	11	30

実測濃度が検出下限未満の場合は"N.D."で表示

表-53 ポリ臭素化ジフェニルエーテル測定結果(降下ばいじん-2) 単位：ng/m²/day

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	N.D.	N.D.	0.09	N.D.	N.D.	N.D.
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4,4'-TrBDE(#28)	0.05	0.14	0.08	N.D.	0.12	0.09
2,3',4',6-TeBDE(#71)	N.D.	N.D.	0.11	N.D.	N.D.	N.D.
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.22	0.29	0.33	0.15	0.30	0.19
2,3',4,4'-TeBDE(#66)	N.D.	N.D.	0.11	N.D.	N.D.	N.D.
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3',4,4',6-PeBDE(#119)	N.D.	N.D.	0.10	N.D.	N.D.	N.D.
2,2',4,4',5-PeBDE(#99)	0.21	0.24	0.49	0.15	0.21	0.15
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	N.D.	0.16	N.D.	N.D.	N.D.
2,2',4,4',5,5'-HxBDE(#153)	N.D.	N.D.	0.49	N.D.	N.D.	N.D.
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	N.D.	0.19	N.D.	N.D.	N.D.
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5,5',6-OcBDE(#203)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6'-OcBDE(#196)	N.D.	N.D.	0.20	N.D.	N.D.	N.D.
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	0.35	0.4	0.63	0.3	2.4	0.2
2,2',3,3',4,4',5,5',6-NoBDE(#206)	0.41	0.3	0.84	0.3	2.7	0.2
DeBDE(#209)	15	8.1	35	8.6	80	6.6
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	N.D.	N.D.	0.09	N.D.	N.D.	N.D.
TrBDEs 総和	0.05	0.14	0.08	N.D.	0.12	0.09
TeBDEs 総和	0.22	0.29	0.55	0.15	0.30	0.19
PeBDEs 総和	0.21	0.24	0.59	0.15	0.21	0.15
HxBDEs 総和	N.D.	N.D.	0.65	N.D.	N.D.	N.D.
HpBDEs 総和	N.D.	N.D.	0.19	N.D.	N.D.	N.D.
OcBDEs 総和	N.D.	N.D.	0.20	N.D.	N.D.	N.D.
NoBDEs 総和	1.0	0.9	1.9	0.6	6.7	0.4
DeBDE	15	8.1	35	8.6	80	6.6
PBDEs 総和	16	9.7	39	9.5	87	7.4

実測濃度が検出下限未満の場合は"N.D."で表示

まとめ及び考察

ポリ臭素化ダイオキシン類は、同族体の総和で22～480 pg/m²/day(平均値120 pg/m²/day)の範囲で検出され、H2地点が最も高い濃度を示した。地域別ではH地域が最も高く(表-54)、地点種類別では市街・住宅地域が最も高かった(表-55)。同族体は、概ねTeBDFs、PeBDFs及びHxBDFsが主成分であったが、H地域では他に比べてTeBDDsの割合が高い同族体組成を示した(図-32)。2,3,7,8-異性体では、H1地点で2,3,7,8-TeBDFが、H2地点で1,2,3,6,7,8-HpBDFが検出された。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/59～1/1.1であった。モノ臭素ポリ塩素化ダイオキシン類同族体総和とポリ臭素化ダイオキシン類同族体総和の相関係数は-0.1057であった(図-35)。

モノ臭素ポリ塩素化ダイオキシン類は、同族体の総和でN.D.～18 pg/m²/day(平均値3.8 pg/m²/day)の範囲で検出され、E2地点が最も高い濃度を示した。地域別ではE地域が最も高く(表-54)、地点種類別では焼却施設周辺地域が最も高かった(表-55)。同族体は、MoB-TrCDD/Fs、MoB-TeCDD/Fs及びMoB-PeCDD/Fsが検出されていたが、検出レベルが低く傾向はつかめなかった(図-33)。2,3,7,8-異性体では、G3地点で3-MoB-2,7,8-TrCDFが検出された。検出されたモノ臭素ポリ塩素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/280～1/41であった。

(塩素化)ダイオキシン類は、0.23～8.2 pg-TEQ/m²/day(平均値3.3 pg-TEQ/m²/day)の範囲で検出され、G2が最も高い濃度を示した。地域別ではH地域が最も高く(表-54)、地点種類別では焼却施設周辺地域が最も高かった(表-55)。モノ臭素ポリ塩素化ダイオキシン類同族体総和と塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の相関係数は-0.0549であった(図-36)。

ポリ臭素化ジフェニルエーテルは、同族体の総和で4.1～91 ng/m²/day(平均値27 ng/m²/day)の範囲で検出され、E1地点が最も高い濃度を示した。地域別ではE地域が最も高く(表-54)、地点種類別では市街・住宅地域が最も高かった(表-55)。同族体組成は、全ての地点でDeBDEが主成分であった(図-34)。ポリ臭素化ダイオキシン類同族体総和及びモノ臭素ポリ塩素化ダイオキシン類同族体総和との相関係数はそれぞれ0.5614及び-0.1959であった(図-37及び38)。

表-54 地域別総括表(降下ばいじん)

	E地域	F地域	G地域	H地域	全地域
PBDDs/DFs 総和 (pg/m ² /day)	57 (29~93)	110 (32~170)	59 (22~110)	240 (100~480)	120 (22~480)
MoBPCDDs/DFs 総和 (pg/m ² /day)	6 (N.D.~18)	2 (N.D.~3)	4 (N.D.~12)	3 (N.D.~9)	3.8 (N.D.~18)
DXNs TEQ (pg-TEQ/m ² /day)	1.8 (0.23~3.9)	2.7 (0.33~4.0)	3.1 (0.29~8.2)	5.7 (4.3~7.4)	3.3 (0.23~8.2)
PBDEs 総和 (ng/m ² /day)	37 (5.6~91)	15 (4.1~30)	22 (9.7~39)	35 (7.4~87)	27 (4.1~91)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

表-55 地点種類別総括表(降下ばいじん)

	市街・住宅地域	工業地域	焼却施設 周辺地域	全地域
PBDDs/DFs 総和 (pg/m ² /day)	150 (32~480)	54 (22~110)	90 (50~130)	120 (22~480)
MoBPCDDs/DFs 総和 (pg/m ² /day)	1.7 (N.D.~9)	4 (N.D.~12)	11 (3~18)	3.8 (N.D.~18)
DXNs TEQ (pg-TEQ/m ² /day)	3.2 (0.29~7.4)	3.0 (0.23~8.2)	4.0 (3.9~4.0)	3.3 (0.23~8.2)
PBDEs 総和 (ng/m ² /day)	35 (4.1~91)	18 (5.6~39)	12 (11~13)	27 (4.1~91)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

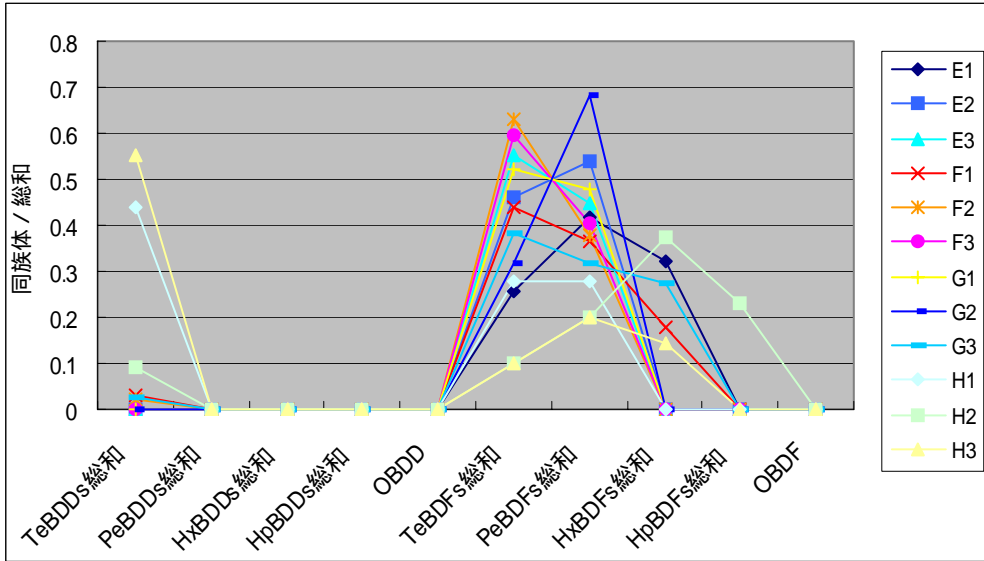


図-32 ポリ臭素化ダイオキシン類同族体分布(降下ばいじん)

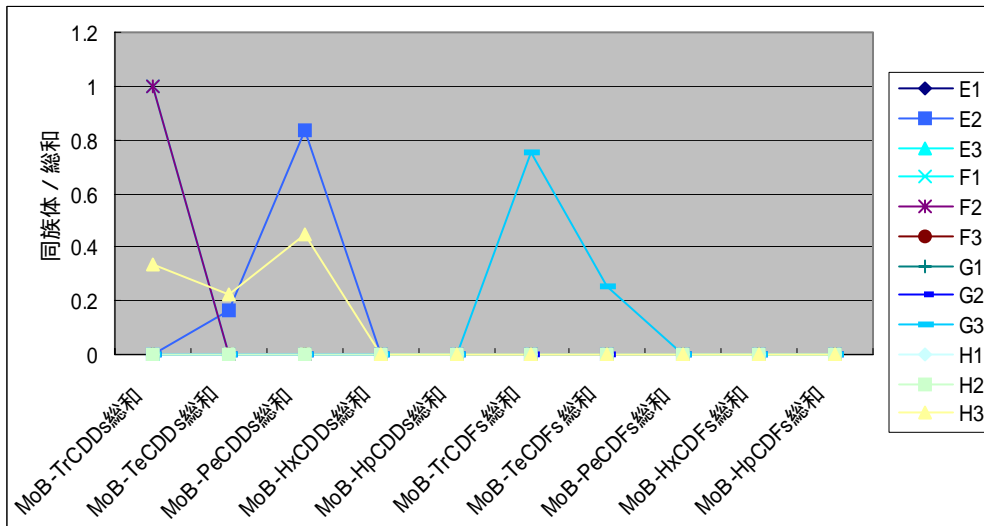


図-33 モノ臭素ポリ塩素化ダイオキシン類同族体分布(降下ばいじん)

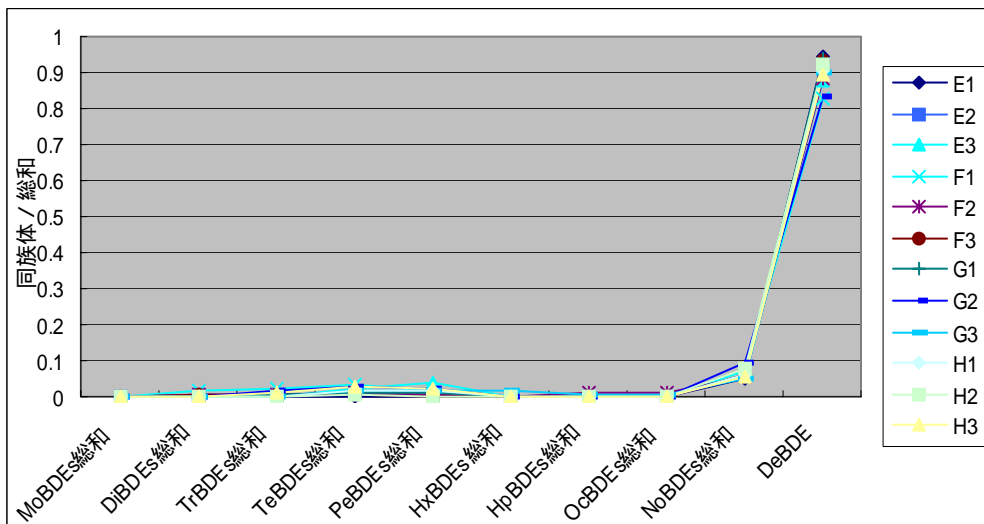


図-34 ポリ臭素化ジフェニルエーテル同族体分布(降下ばいじん)

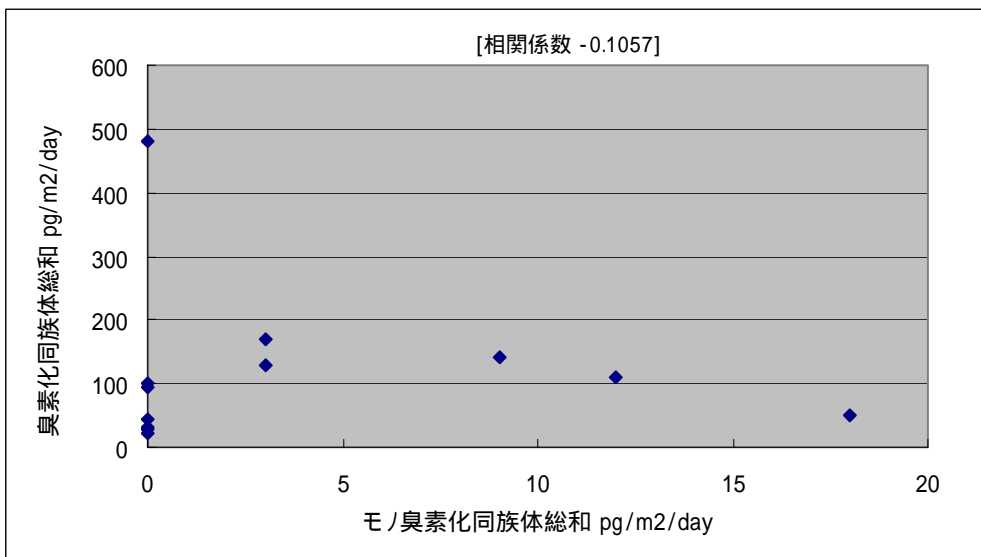


図-35 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ダイオキシン類同族体総和の相関(降下ばいじん)

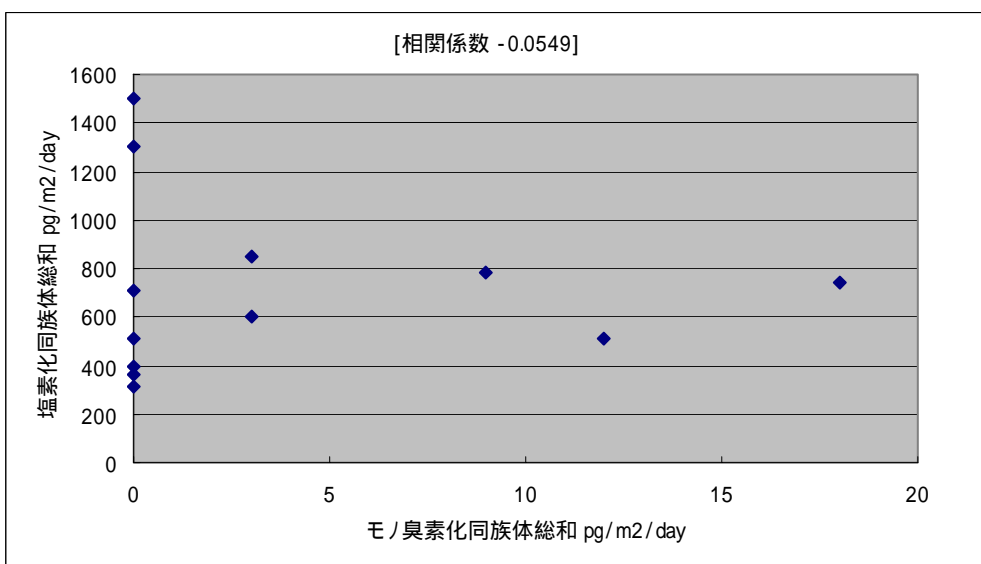


図-36 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
(塩素化)ダイオキシン類同族体総和の相関(降下ばいじん)

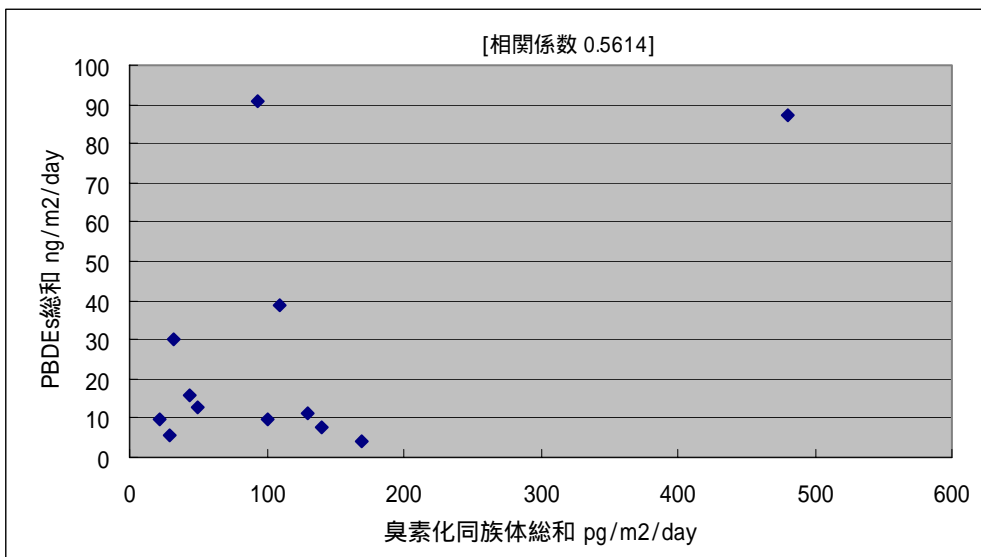


図-37 ポリ臭素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(降下ばいじん)

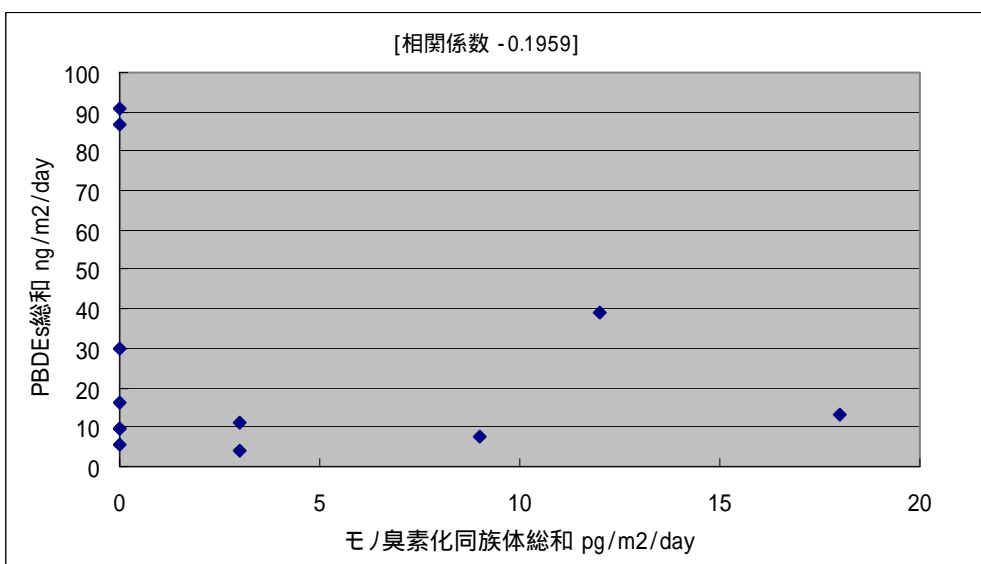


図-38 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(降下ばいじん)

(3) 土壌

土壌中の臭素系ダイオキシン類の測定結果を表-56～59に、(塩素化)ダイオキシン類の測定結果を表-60及び61に、ポリ臭素化ジフェニルエーテルの結果を表-62及び63に示した。

表-56 臭素系(全臭素)ダイオキシン類測定結果(土壌-1)

単位：pg/g

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	N.D.	N.D.	N.D.	N.D.	0.3	0.2
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	4.7	0.4	6.0	0.9	1.7	N.D.
PeBDFs総和	N.D.	N.D.	0.9	0.8	1.0	N.D.
HxBDFs総和	N.D.	N.D.	2	N.D.	2	N.D.
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	4.7	0.4	8.9	1.7	5.0	0.2

実測濃度が検出下限未満の場合は"N.D."で表示

表-57 臭素系(全臭素)ダイオキシン類測定結果(土壌-2)

単位 : pg/g

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	N.D.	N.D.	N.D.	0.9	0.6	0.3
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	N.D.	0.7	1.4	1.2	2.0	2.6
PeBDFs総和	N.D.	0.6	1.6	N.D.	0.9	0.9
HxBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	2
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	N.D.	1.3	3.0	2.1	3.5	5.8

実測濃度が検出下限未満の場合は"N.D."で表示

表-58 臭素系(モノ臭素)ダイオキシン類測定結果(土壌-1)

単位: pg/g

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

実測濃度が検出下限未満の場合は"N.D."で表示

表-59 臭素系(モノ臭素)ダイオキシン類測定結果(土壌-2)

単位: pg/g

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	5	N.D.	N.D.	N.D.	N.D.	6
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	5	10	N.D.	N.D.	N.D.	6
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	5	10	N.D.	N.D.	N.D.	6

実測濃度が検出下限未満の場合は"N.D."で表示

表-60 (塩素化)ダイオキシン類測定結果(土壌-1)

単位: pg/g

分析項目		E地域			F地域		
		E1	E2	E3	F1	F2	F3
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	N.D.	(0.09)	(0.14)	N.D.
	1,3,6,8-TeCDD	(2.1)	N.D.	3.1	3.5	7.4	6.0
	1,3,7,9-TeCDD	(0.8)	N.D.	(1.1)	(1.3)	2.8	2.8
	1,2,3,7,8-PeCDD	0.25	N.D.	0.23	0.34	0.43	0.20
	1,2,3,4,7,8-HxCDD	(0.2)	N.D.	(0.1)	(0.3)	0.5	(0.2)
	1,2,3,6,7,8-HxCDD	0.58	N.D.	(0.27)	0.55	0.99	0.31
	1,2,3,7,8,9-HxCDD	1.1	(0.2)	0.8	0.6	1.1	(0.4)
	1,2,3,4,6,7,8-HpCDD	8.7	0.5	2.6	6.6	14	3.1
	OCDD	58	3.5	16	60	81	9.3
ジベンゾフラン	2,3,7,8-TeCDF	0.35	N.D.	0.25	0.42	0.54	(0.13)
	1,2,7,8-TeCDF	0.32	N.D.	0.23	0.51	0.64	(0.17)
	1,2,3,7,8-PeCDF	0.56	(0.12)	0.30	0.69	1.0	0.34
	2,3,4,7,8-PeCDF	0.43	0.15	0.21	0.63	0.84	0.39
	1,2,3,4,7,8-HxCDF	0.7	N.D.	(0.4)	0.8	1.3	0.6
	1,2,3,6,7,8-HxCDF	0.7	N.D.	0.3	0.7	1.0	0.5
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	(0.08)	N.D.
	2,3,4,6,7,8-HxCDF	0.78	N.D.	0.41	0.77	1.5	0.67
	1,2,3,4,6,7,8-HpCDF	3.4	0.35	1.8	2.8	4.6	2.4
	1,2,3,4,7,8,9-HpCDF	0.43	N.D.	0.30	0.41	0.74	0.48
OCDF	2.8	(0.3)	2.1	2.4	3.8	2.3	
コブジナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	0.40	N.D.	(0.17)	0.60	0.35	N.D.
	3,3',4,4'-TeCB(#77)	7.9	1.3	4.9	13	3.7	0.62
	3,3',4,4',5-PeCB(#126)	1.6	0.88	0.47	2.8	1.2	0.26
	3,3',4,4',5,5'-HxCB(#169)	0.38	0.30	(0.26)	0.34	(0.24)	N.D.
	モノオルト						
	2',3,4,4',5-PeCB(#123)	1.1	N.D.	0.36	2.1	1.1	N.D.
	2,3',4,4',5-PeCB(#118)	37	1.5	11	72	34	1.8
	2,3,3',4,4'-PeCB(#105)	21	0.8	5.9	40	17	1.0
	2,3,4,4',5-PeCB(#114)	1.1	N.D.	0.34	1.4	0.65	(0.10)
	2,3',4,4',5,5'-HxCB(#167)	3.0	N.D.	0.49	4.7	2.6	N.D.
	2,3,3',4,4',5-HxCB(#156)	6.8	(0.2)	1.2	8.2	5.8	N.D.
	2,3,3',4,4',5'-HxCB(#157)	1.9	N.D.	(0.3)	2.9	1.9	N.D.
2,3,3',4,4',5,5'-HpCB(#189)	1.3	N.D.	(0.3)	1.9	1.3	N.D.	
TEQ(PCDDs+PCDFs) (pg-TEQ/g)	1.0	0.084	0.57	1.2	1.8	0.68	
TEQ(Co-PCBs) (pg-TEQ/g)	0.18	0.091	0.050	0.30	0.13	0.026	
TEQ総和(pg-TEQ/g)	1.2	0.18	0.62	1.5	1.9	0.71	
同族体	ダイオキシン						
	TeCDDs総和	2.9	N.D.	4.2	6.1	12	10
	PeCDDs総和	2.9	0.16	1.7	3.9	8.1	7.1
	HxCDDs総和	8.0	1.6	5.8	6.9	14	6.4
	HpCDDs総和	17	1.1	5.6	14	30	5.9
	OCDD	58	3.5	16	60	81	9.3
	PCDDs総和	88.8	6.36	33.3	90.9	145.1	38.7
	ジベンゾフラン						
	TeCDFs総和	7.4	0.95	4.1	11	14	3.8
	PeCDFs総和	6.2	0.89	3.4	9.1	13	4.7
	HxCDFs総和	6.2	0.4	2.9	7.1	11	5.0
	HpCDFs総和	6.0	0.50	3.2	5.2	8.7	4.8
	OCDF	2.8	0.3	2.1	2.4	3.8	2.3
	PCDFs総和	28.6	3.04	15.7	34.8	50.5	20.6
(PCDDs+PCDFs)総和	120	9.4	49	130	200	59	

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-61 (塩素化)ダイオキシン類測定結果(土壌-2)

単位 : pg/g

分析項目		G地域			H地域		
		G1	G2	G3	H1	H2	H3
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	(0.12)
	1,3,6,8-TeCDD	(1.0)	(1.5)	(1.9)	(1.9)	N.D.	4.7
	1,3,7,9-TeCDD	N.D.	(0.8)	(1.2)	(0.7)	N.D.	2.1
	1,2,3,7,8-PeCDD	N.D.	(0.16)	N.D.	N.D.	N.D.	0.50
	1,2,3,4,7,8-HxCDD	(0.2)	(0.2)	N.D.	N.D.	N.D.	0.5
	1,2,3,6,7,8-HxCDD	(0.25)	(0.27)	(0.26)	(0.10)	N.D.	0.82
	1,2,3,7,8,9-HxCDD	(0.3)	(0.3)	(0.2)	N.D.	N.D.	1.0
	1,2,3,4,6,7,8-HpCDD	5.5	5.7	2.4	0.9	0.5	10
	OCDD	320	420	39	8.3	5.0	630
ジベンゾフラン	2,3,7,8-TeCDF	(0.14)	0.34	0.46	(0.08)	N.D.	0.70
	1,2,7,8-TeCDF	(0.15)	0.32	0.59	N.D.	N.D.	0.80
	1,2,3,7,8-PeCDF	0.22	0.46	0.56	(0.14)	(0.08)	1.4
	2,3,4,7,8-PeCDF	0.24	0.39	0.34	(0.10)	N.D.	1.1
	1,2,3,4,7,8-HxCDF	(0.4)	0.5	(0.4)	(0.2)	(0.1)	1.6
	1,2,3,6,7,8-HxCDF	0.4	0.4	0.4	(0.1)	N.D.	1.4
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	(0.17)
	2,3,4,6,7,8-HxCDF	0.63	0.47	0.39	(0.18)	(0.12)	1.7
	1,2,3,4,6,7,8-HpCDF	1.8	1.7	1.4	0.67	0.29	5.7
	1,2,3,4,7,8,9-HpCDF	0.36	(0.23)	(0.21)	(0.13)	N.D.	0.90
OCDF	3.3	1.4	1.7	0.7	(0.2)	4.3	
コブリンナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	N.D.	0.49	(0.25)	N.D.	N.D.	0.93
	3,3',4,4'-TeCB(#77)	1.2	9.5	4.6	1.0	0.46	17
	3,3',4,4',5-PeCB(#126)	0.33	3.8	0.85	0.22	(0.11)	2.4
	3,3',4,4',5,5'-HxCB(#169)	N.D.	0.51	(0.15)	N.D.	N.D.	0.39
	モノオルト						
	2',3,4,4',5-PeCB(#123)	(0.25)	3.3	0.42	N.D.	N.D.	1.4
	2,3',4,4',5-PeCB(#118)	7.3	160	13	4.5	2.0	59
	2,3,3',4,4'-PeCB(#105)	3.7	75	7.5	2.2	1.1	31
	2,3,4,4',5-PeCB(#114)	0.22	3.2	0.36	N.D.	N.D.	1.5
	2,3',4,4',5,5'-HxCB(#167)	1.1	30	2.1	0.28	(0.16)	5.6
	2,3,3',4,4',5-HxCB(#156)	2.0	67	4.2	0.7	(0.3)	12
	2,3,3',4,4',5'-HxCB(#157)	0.8	13	1.3	N.D.	N.D.	3.3
2,3,3',4,4',5,5'-HpCB(#189)	(0.3)	12	0.7	N.D.	N.D.	1.9	
TEQ(PCDDs+PCDFs) (pg-TEQ/g)		0.34	0.51	0.37	0.017	0.0084	2.1
TEQ(Co-PCBs) (pg-TEQ/g)		0.036	0.45	0.091	0.023	0.00036	0.26
TEQ総和(pg-TEQ/g)		0.38	0.96	0.46	0.040	0.0088	2.4
同族体	ダイオキシン						
	TeCDDs総和	1.0	3.3	3.6	2.6	N.D.	9.4
	PeCDDs総和	1.5	2.2	1.9	0.46	N.D.	7.7
	HxCDDs総和	4.2	4.6	2.9	0.9	0.4	13
	HpCDDs総和	11	13	5.1	1.9	1.0	24
	OCDD	320	420	39	8.3	5.0	630
	PCDDs総和	337.7	443.1	52.5	14.16	6.4	684.1
	ジベンゾフラン						
	TeCDFs総和	2.7	7.4	8.8	1.1	N.D.	19
	PeCDFs総和	3.1	5.6	5.0	1.3	0.32	17
	HxCDFs総和	3.4	4.2	3.0	1.2	0.22	15
	HpCDFs総和	3.4	2.8	2.2	1.3	0.39	10
	OCDF	3.3	1.4	1.7	0.7	0.2	4.3
	PCDFs総和	15.9	21.4	20.7	5.6	1.13	65.3
(PCDDs+PCDFs)総和		350	460	73	20	7.5	750

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-62 ポリ臭素化ジフェニルエーテル測定結果(土壌-1)

単位: ng/g

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4,4'-TrBDE(#28)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3',4',6-TeBDE(#71)	N.D.	N.D.	N.D.	0.006	N.D.	N.D.
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	N.D.	N.D.	0.006	0.022	0.013	N.D.
2,3',4,4'-TeBDE(#66)	N.D.	N.D.	N.D.	0.007	N.D.	N.D.
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3',4,4',6-PeBDE(#119)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5-PeBDE(#99)	N.D.	N.D.	0.006	0.013	0.010	N.D.
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,5'-HxBDE(#153)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5,5',6-OcBDE(#203)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6'-OcBDE(#196)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	0.01	N.D.	0.03	0.02	0.04	N.D.
2,2',3,3',4,4',5,5',6-NoBDE(#206)	0.01	N.D.	0.05	0.02	0.03	N.D.
DeBDE(#209)	0.30	0.07	1.2	0.37	0.67	0.21
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TrBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDEs 総和	N.D.	N.D.	0.006	0.035	0.013	N.D.
PeBDEs 総和	N.D.	N.D.	0.006	0.013	0.010	N.D.
HxBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OcBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
NoBDEs 総和	0.02	N.D.	0.10	0.05	0.10	N.D.
DeBDE	0.30	0.07	1.2	0.37	0.67	0.21
PBDEs 総和	0.32	0.07	1.3	0.47	0.79	0.21

実測濃度が検出下限未満の場合は"N.D."で表示

表-63 ポリ臭素化ジフェニルエーテル測定結果(土壌-2)

単位: ng/g

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4,4'-TrBDE(#28)	N.D.	N.D.	N.D.	N.D.	N.D.	0.005
2,3',4',6-TeBDE(#71)	N.D.	N.D.	0.011	N.D.	N.D.	0.007
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	N.D.	0.017	0.037	N.D.	N.D.	0.024
2,3',4,4'-TeBDE(#66)	N.D.	N.D.	0.014	N.D.	N.D.	0.007
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3',4,4',6-PeBDE(#119)	N.D.	N.D.	0.013	N.D.	N.D.	N.D.
2,2',4,4',5-PeBDE(#99)	N.D.	0.014	0.053	N.D.	N.D.	0.016
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	N.D.	0.01	N.D.	N.D.	N.D.
2,2',4,4',5,5'-HxBDE(#153)	N.D.	N.D.	0.11	N.D.	N.D.	N.D.
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	0.01	0.02	N.D.	N.D.	0.02
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	N.D.	0.01	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5,5',6-OcBDE(#203)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6'-OcBDE(#196)	N.D.	0.01	0.02	N.D.	N.D.	N.D.
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	0.01	0.05	0.05	0.16	N.D.	0.04
2,2',3,3',4,4',5,5',6-NoBDE(#206)	N.D.	0.04	0.08	0.15	N.D.	0.04
DeBDE(#209)	0.22	1.2	0.78	4.0	0.10	0.61
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TrBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.005
TeBDEs 総和	N.D.	0.017	0.062	N.D.	N.D.	0.038
PeBDEs 総和	N.D.	0.014	0.075	N.D.	N.D.	0.016
HxBDEs 総和	N.D.	N.D.	0.12	N.D.	N.D.	N.D.
HpBDEs 総和	N.D.	0.01	0.02	N.D.	N.D.	0.02
OcBDEs 総和	N.D.	0.02	0.02	N.D.	N.D.	N.D.
NoBDEs 総和	0.01	0.12	0.16	0.42	N.D.	0.11
DeBDE	0.22	1.2	0.78	4.0	0.10	0.61
PBDEs 総和	0.23	1.4	1.2	4.4	0.10	0.80

実測濃度が検出下限未満の場合は"N.D."で表示

まとめ及び考察

ポリ臭素化ダイオキシン類は、同族体の総和でN.D. ~ 8.9 pg/g(平均値3.1 pg/g)の範囲で検出され、E3地点が最も高い濃度を示した。地域別ではE地域が最も高く(表-64)、地点種類別では工業地域が最も高かった(表-65)。同族体は、TeBDDs、TeBDFs、PeBDFs及びHxBDFsが検出された(図-39)。2,3,7,8-異性体で検出されたものはなかった。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/350 ~ 1/2であった。モノ臭素ポリ塩素化ダイオキシン類とポリ臭素化ダイオキシン類同族体総和の相関係数は-0.1643であった(図-42)。

モノ臭素ポリ塩素化ダイオキシン類は、同族体の総和でN.D. ~ 10 pg/g(平均値1.8 pg/g)の範囲で検出され、G2地点が最も高い濃度を示した。地域別ではG地域が最も高く(表-64)、地点種類別では工業地域が最も高かった(表-65)。同族体は、G1、G2及びH3地点からMoB-HpCDDsが検出されてた(図-40)。2,3,7,8-異性体では、G1及びH3地点から1-MoB-2,3,4,6,7,8,9-HpCDDが検出された。検出されたモノ臭素ポリ塩素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/130 ~ 1/46であった。

(塩素化)ダイオキシン類は、0.0088 ~ 2.4 pg-TEQ/g(平均値0.94 pg-TEQ/g)の範囲で検出され、H3地点が最も高い濃度を示した。地域別ではF地域が最も高く(表-64)、地点種類別では焼却施設周辺地域が最も高かった(表-65)。モノ臭素ポリ塩素化ダイオキシン類同族体総和と塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の相関係数は0.8289であった(図-43)。

ポリ臭素化ジフェニルエーテルは、同族体の総和で0.07 ~ 4.4 ng/g(平均値0.94 ng/g)の範囲で検出され、H1地点が最も高い濃度を示した。地域別ではH地域が最も高く(表-64)、地点種類別では工業地域が最も高かった(表-65)。同族体組成は、全ての地点でDeBDEが主成分であった(図-41)。ポリ臭素化ダイオキシン類同族体総和及びモノ臭素ポリ塩素化ダイオキシン類同族体総和との相関係数はそれぞれ0.0889及び0.0044であった(図-44及び45)。

表-64 地域別総括表(土壌)

	E地域	F地域	G地域	H地域	全地域
PBDDs/DFs 総和 (pg/g)	4.7 (0.4~8.9)	2.3 (0.2~5.0)	1.4 (N.D.~3.0)	3.8 (2.1~5.8)	3.1 (N.D.~8.9)
MoBPCDDs/DFs 総和 (pg/g)	0 (N.D.~N.D.)	0 (N.D.~N.D.)	5.0 (N.D.~10)	2.0 (N.D.~6)	1.8 (N.D.~10)
DXNs TEQ (pg-TEQ/g)	0.67 (0.18~1.2)	1.4 (0.71~1.9)	0.60 (0.38~0.96)	0.82 (0.0088~2.4)	0.86 (0.0088~2.4)
PBDEs 総和 (ng/g)	0.56 (0.07~1.3)	0.49 (0.21~0.79)	0.94 (0.23~1.4)	1.8 (0.10~4.4)	0.94 (0.07~4.4)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

表-65 地点種類別総括表(土壌)

	市街・住宅地域	工業地域	焼却施設 周辺地域	全地域
PBDDs/DFs 総和 (pg/g)	2.6 (N.D.~5.8)	4.4 (1.3~8.9)	2.7 (0.4~5.0)	3.1 (N.D.~8.9)
MoBPCDDs/DFs 総和 (pg/g)	1.6 (N.D.~6)	3.3 (N.D.~10)	0 (N.D.~N.D.)	1.8 (N.D.~10)
DXNs TEQ (pg-TEQ/g)	0.89 (0.0088~2.4)	0.68 (0.46~0.96)	1.0 (0.18~1.9)	0.86 (0.0088~2.4)
PBDEs 総和 (ng/g)	0.93 (0.10~4.4)	1.3 (1.2~1.4)	0.43 (0.07~0.79)	0.94 (0.07~4.4)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

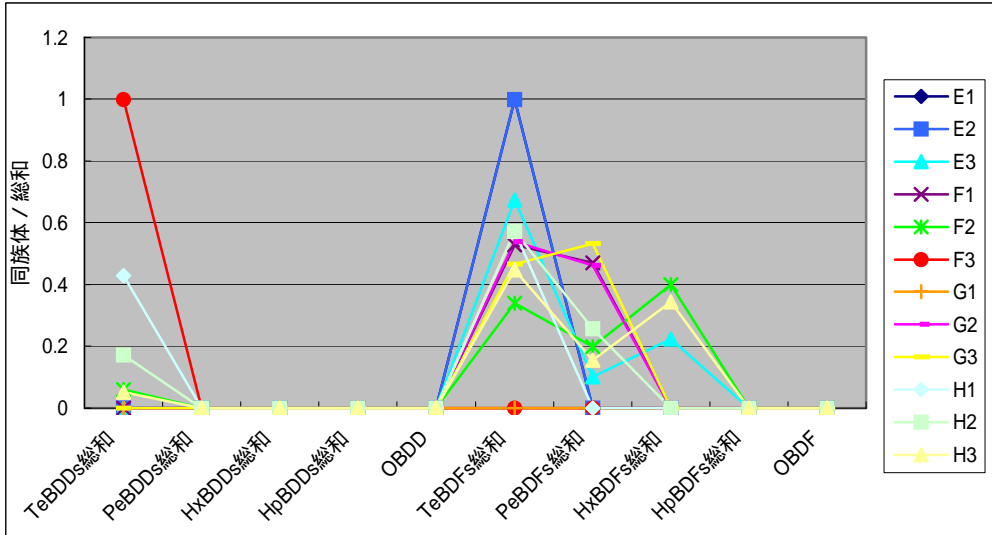


図-39 ポリ臭素化ダイオキシン類同族体分布(土壌)

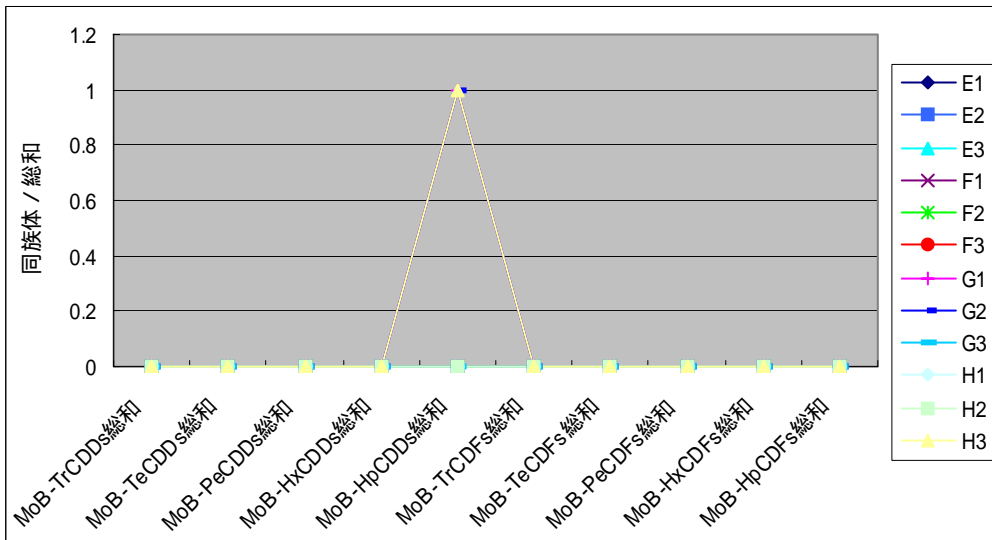


図-40 モノ臭素ポリ塩素化ダイオキシン類同族体分布(土壌)

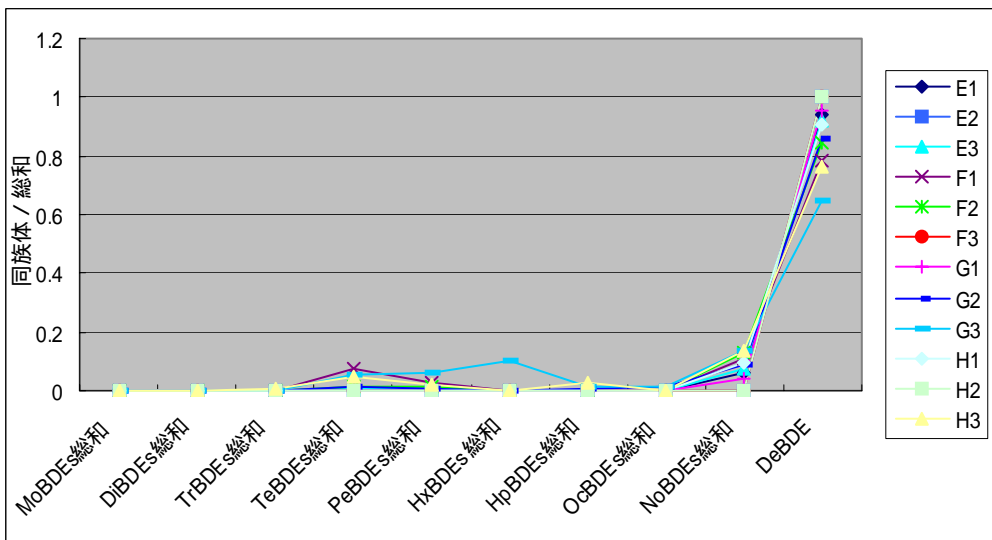


図-41 ポリ臭素化ジフェニルエーテル同族体分布(土壌)

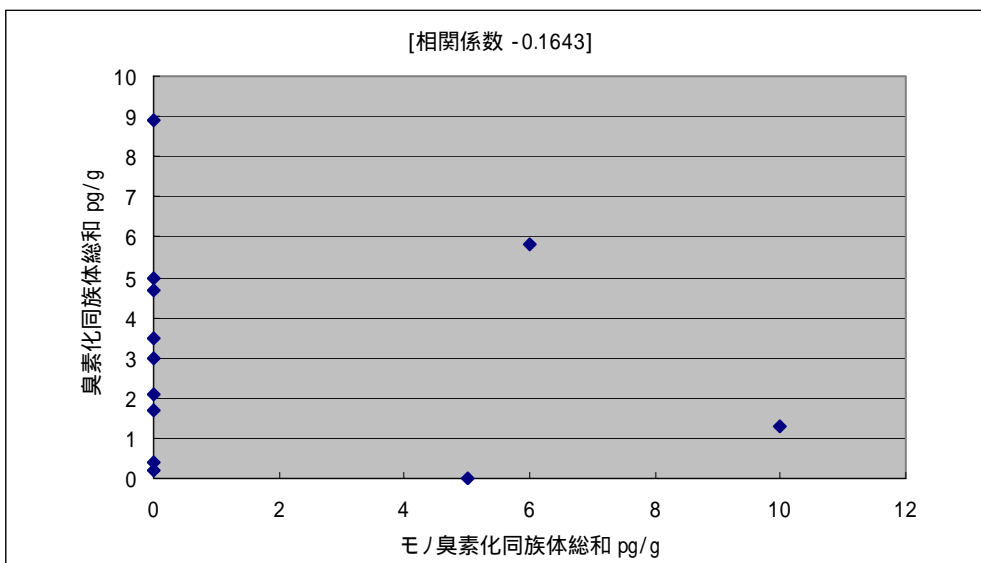


図-42 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ダイオキシン類同族体総和の相関(土壌)

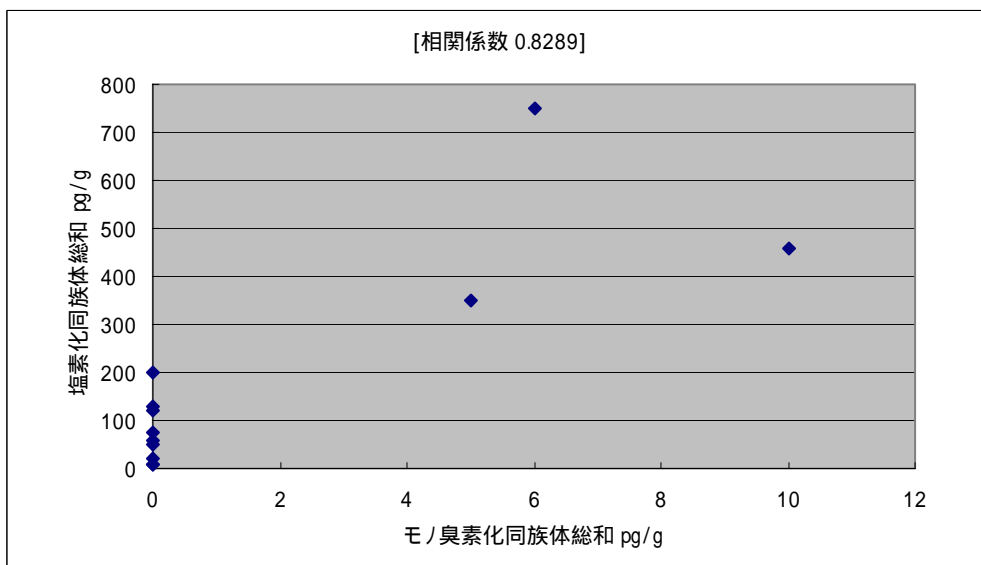


図-43 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
(塩素化)ダイオキシン類同族体総和の相関(土壌)

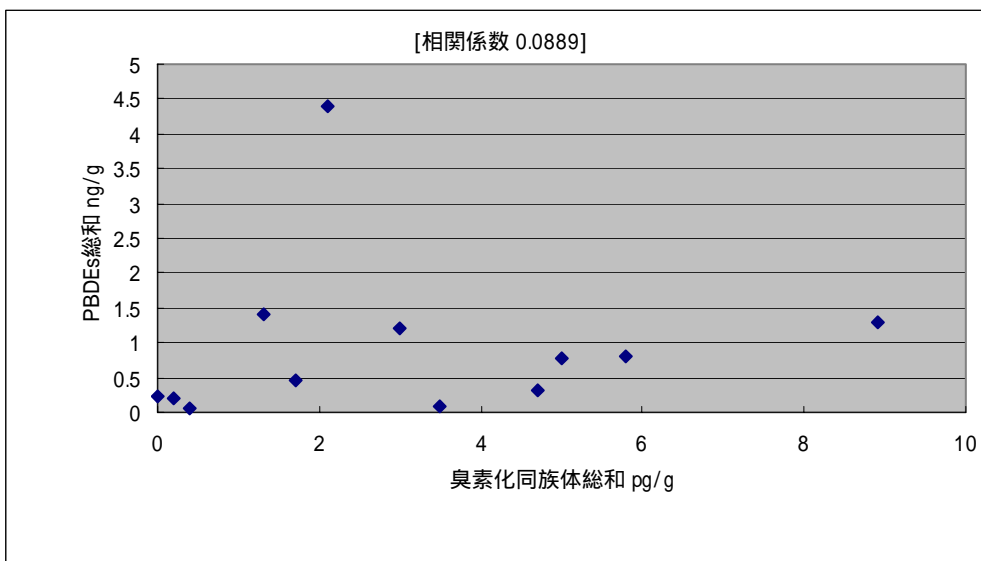


図-44 ポリ臭素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(土壌)

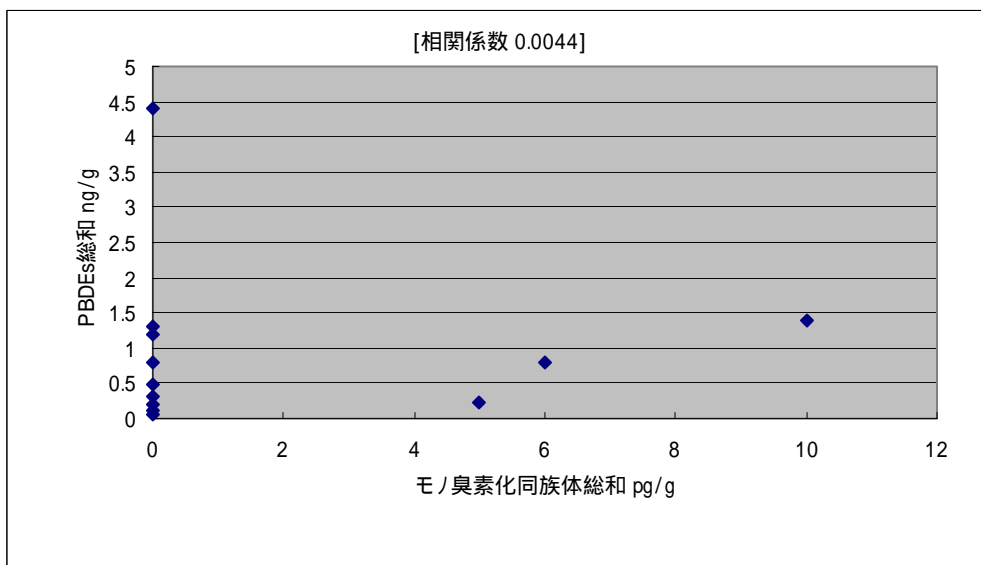


図-45 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(土壌)

(4) 地下水

地下水の臭素系ダイオキシン類の測定結果を表-66～69に、(塩素化)ダイオキシン類の測定結果を表-70及び71に示した。

表-66 臭素系(全臭素)ダイオキシン類測定結果(地下水-1)

単位：pg/L

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	0.2
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	0.03	0.03	0.09	0.03	0.02	N.D.
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.03	0.05	0.08	0.05	N.D.	0.01
PeBDFs総和	N.D.	N.D.	0.02	0.03	N.D.	0.02
HxBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.2
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	0.06	0.08	0.19	0.11	0.02	0.23

実測濃度が検出下限未満の場合は"N.D."で表示

表-67 臭素系(全臭素)ダイオキシン類測定結果(地下水-2)

単位 : pg/L

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	0.01	0.01	0.01	0.02	0.01	0.04
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.02	N.D.	0.07	N.D.	N.D.	0.01
PeBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	0.03	0.01	0.08	0.02	0.01	0.05

実測濃度が検出下限未満の場合は"N.D."で表示

表-68 臭素系(モノ臭素)ダイオキシン類測定結果(地下水-1)

単位: pg/L

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

実測濃度が検出下限未満の場合は"N.D."で表示

表-69 臭素系(モノ臭素)ダイオキシン類測定結果(地下水-2)

単位: pg/L

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

実測濃度が検出下限未満の場合は"N.D."で表示

表-70 (塩素化)ダイオキシン類測定結果(地下水-1)

単位: pg/L

分析項目		E地域			F地域		
		E1	E2	E3	F1	F2	F3
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,3,6,8-TeCDD	N.D.	(0.05)	0.14	(0.05)	(0.08)	(0.04)
	1,3,7,9-TeCDD	N.D.	N.D.	0.08	(0.03)	(0.04)	N.D.
	1,2,3,7,8-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,7,8-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,6,7,8-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,6,7,8-HpCDD	N.D.	N.D.	N.D.	(0.03)	N.D.	N.D.
	OCDD	N.D.	(0.1)	(0.1)	0.4	(0.1)	(0.1)
ジベンゾフラン	2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,7,8-PeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3,4,7,8-PeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,7,8-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,6,7,8-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3,4,6,7,8-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,6,7,8-HpCDF	N.D.	(0.02)	N.D.	(0.02)	N.D.	(0.04)
	1,2,3,4,7,8,9-HpCDF	N.D.	N.D.	(0.03)	N.D.	N.D.	N.D.
OCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	
コブジナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	3,3',4,4'-TeCB(#77)	(0.06)	(0.08)	0.17	0.30	0.13	(0.08)
	3,3',4,4',5-PeCB(#126)	N.D.	N.D.	N.D.	(0.04)	N.D.	N.D.
	3,3',4,4',5,5'-HxCB(#169)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	モノオルト						
	2',3,4,4',5-PeCB(#123)	N.D.	N.D.	(0.02)	0.44	N.D.	N.D.
	2,3',4,4',5-PeCB(#118)	0.8	(0.7)	1.1	18	0.9	(0.6)
	2,3,3',4,4'-PeCB(#105)	0.3	0.3	0.4	5.8	0.3	(0.2)
	2,3,4,4',5-PeCB(#114)	N.D.	N.D.	N.D.	0.33	N.D.	N.D.
	2,3',4,4',5,5'-HxCB(#167)	(0.04)	N.D.	(0.05)	1.9	(0.05)	N.D.
	2,3,3',4,4',5-HxCB(#156)	(0.10)	(0.09)	0.15	2.9	(0.10)	(0.07)
	2,3,3',4,4',5'-HxCB(#157)	N.D.	N.D.	N.D.	1.3	N.D.	N.D.
2,3,3',4,4',5,5'-HpCB(#189)	N.D.	N.D.	N.D.	0.20	N.D.	N.D.	
TEQ(PCDDs+PCDFs)(pg-TEQ/L)		0.037	0.037	0.037	0.037	0.037	0.038
TEQ(Co-PCBs)(pg-TEQ/L)		0.0023	0.0029	0.0025	0.0090	0.0024	0.0028
TEQ総和(pg-TEQ/L)		0.039	0.040	0.039	0.046	0.039	0.040
同族体	ダイオキシン						
	TeCDDs総和	N.D.	0.05	0.22	0.08	0.12	0.04
	PeCDDs総和	N.D.	0.08	N.D.	0.03	0.03	N.D.
	HxCDDs総和	N.D.	0.03	0.08	0.04	0.04	N.D.
	HpCDDs総和	N.D.	N.D.	0.03	0.06	N.D.	0.03
	OCDD	N.D.	0.1	0.1	0.4	0.1	0.1
	PCDDs総和	0	0.26	0.43	0.61	0.29	0.17
	ジベンゾフラン						
	TeCDFs総和	N.D.	N.D.	0.27	0.024	0.065	N.D.
	PeCDFs総和	N.D.	N.D.	0.02	0.02	N.D.	0.02
	HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	HpCDFs総和	N.D.	0.02	0.03	0.02	N.D.	0.04
	OCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	PCDFs総和	0	0.02	0.32	0.064	0.065	0.06
(PCDDs+PCDFs)総和		0	0.28	0.75	0.67	0.36	0.23

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-71 (塩素化)ダイオキシン類測定結果(地下水-2)

単位: pg/L

分析項目		G地域			H地域		
		G1	G2	G3	H1	H2	H3
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,3,6,8-TeCDD	(0.06)	(0.04)	2.8	N.D.	N.D.	N.D.
	1,3,7,9-TeCDD	(0.04)	(0.03)	1.0	N.D.	N.D.	N.D.
	1,2,3,7,8-PeCDD	N.D.	N.D.	(0.03)	N.D.	N.D.	N.D.
	1,2,3,4,7,8-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,6,7,8-HxCDD	N.D.	N.D.	(0.06)	N.D.	N.D.	N.D.
	1,2,3,7,8,9-HxCDD	N.D.	N.D.	(0.04)	N.D.	N.D.	N.D.
	1,2,3,4,6,7,8-HpCDD	0.32	(0.04)	0.51	N.D.	N.D.	N.D.
	OCDD	3.8	0.9	5.2	N.D.	N.D.	N.D.
ジベンゾフラン	2,3,7,8-TeCDF	N.D.	N.D.	0.091	N.D.	N.D.	N.D.
	1,2,7,8-TeCDF	(0.02)	N.D.	0.11	N.D.	N.D.	N.D.
	1,2,3,7,8-PeCDF	N.D.	N.D.	0.13	N.D.	N.D.	N.D.
	2,3,4,7,8-PeCDF	N.D.	N.D.	0.11	N.D.	N.D.	N.D.
	1,2,3,4,7,8-HxCDF	N.D.	N.D.	0.11	N.D.	N.D.	N.D.
	1,2,3,6,7,8-HxCDF	N.D.	N.D.	(0.08)	N.D.	N.D.	N.D.
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3,4,6,7,8-HxCDF	N.D.	N.D.	0.10	N.D.	N.D.	N.D.
	1,2,3,4,6,7,8-HpCDF	N.D.	N.D.	0.30	N.D.	N.D.	N.D.
	1,2,3,4,7,8,9-HpCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OCDF	N.D.	N.D.	(0.12)	N.D.	N.D.	N.D.	
コブリンナールPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	N.D.	N.D.	(0.04)	N.D.	N.D.	N.D.
	3,3',4,4'-TeCB(#77)	0.19	(0.09)	0.26	N.D.	(0.06)	(0.05)
	3,3',4,4',5-PeCB(#126)	N.D.	N.D.	(0.12)	N.D.	N.D.	N.D.
	3,3',4,4',5,5'-HxCB(#169)	N.D.	N.D.	(0.04)	N.D.	N.D.	N.D.
	モノオルト						
	2',3,4,4',5-PeCB(#123)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3',4,4',5-PeCB(#118)	2.1	(0.7)	1.1	(0.3)	(0.3)	(0.4)
	2,3,3',4,4',5-PeCB(#105)	0.8	0.3	0.5	(0.11)	(0.1)	(0.1)
	2,3,4,4',5-PeCB(#114)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3',4,4',5,5'-HxCB(#167)	(0.07)	(0.03)	0.11	N.D.	N.D.	N.D.
	2,3,3',4,4',5-HxCB(#156)	0.22	(0.09)	0.20	(0.04)	(0.05)	(0.04)
	2,3,3',4,4',5'-HxCB(#157)	N.D.	N.D.	(0.05)	N.D.	N.D.	N.D.
	2,3,3',4,4',5,5'-HpCB(#189)	N.D.	N.D.	(0.04)	N.D.	N.D.	N.D.
TEQ(PCDDs+PCDFs) (pg-TEQ/L)		0.041	0.037	0.16	0.037	0.037	0.037
TEQ(Co-PCBs) (pg-TEQ/L)		0.0031	0.0024	0.013	0.0022	0.0022	0.0022
TEQ総和(pg-TEQ/L)		0.044	0.040	0.17	0.039	0.039	0.039
同族体	ダイオキシン						
	TeCDDs総和	0.10	0.07	4.2	N.D.	N.D.	N.D.
	PeCDDs総和	0.07	0.05	1.1	N.D.	N.D.	N.D.
	HxCDDs総和	0.31	0.04	1.2	N.D.	N.D.	N.D.
	HpCDDs総和	0.70	0.09	1.2	N.D.	N.D.	N.D.
	OCDD	3.8	0.9	5.2	N.D.	N.D.	N.D.
	PCDDs総和	4.98	1.15	12.9	0	0	0
	ジベンゾフラン						
	TeCDFs総和	0.21	0.076	2.5	N.D.	N.D.	N.D.
	PeCDFs総和	0.02	N.D.	1.4	N.D.	N.D.	N.D.
	HxCDFs総和	N.D.	N.D.	0.86	N.D.	N.D.	N.D.
	HpCDFs総和	N.D.	N.D.	0.40	N.D.	N.D.	N.D.
	OCDF	N.D.	N.D.	0.12	N.D.	N.D.	N.D.
	PCDFs総和	0.23	0.076	5.28	0	0	0
(PCDDs+PCDFs)総和		5.2	1.2	18	0	0	0

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

まとめ及び考察

ポリ臭素化ダイオキシン類は、同族体の総和で0.01～0.23 pg/L(平均値0.074 pg/L)の範囲で検出され、F3地点が最も高い濃度を示した。地域別ではF地域が最も高く(表-72)、地点種類別では工業地域が最も高かった(表-73)。同族体は、TeBDFsまたはTeBDDsが主成分である同族体組成が主であったが、F3地点のみHpBDFsが最も高かった(図-46)。2,3,7,8-異性体では、F3地点から1,2,3,4,6,7,8-HpBDFが検出された。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/230～1であった。

モノ臭素ポリ塩素化ダイオキシン類は検出されなかった。

(塩素化)ダイオキシン類は、0.039～0.17 pg-TEQ/L(平均値0.051 pg-TEQ/L)の範囲で検出され、G3地点が最も高い濃度を示した。地域別ではG地域が最も高く(表-72)、地点種類別では工業地域が最も高かった(表-73)。

表-72 地域別総括表(地下水)

	E地域	F地域	G地域	H地域	全地域
PBDDs/DFs 総和 (pg/L)	0.11 (0.06～0.19)	0.12 (0.02～0.23)	0.040 (0.01～0.08)	0.027 (0.01～0.05)	0.074 (0.01～0.23)
MoBPCDDs/DFs 総和 (pg/L)	0 (N.D.～N.D.)	0 (N.D.～N.D.)	0 (N.D.～N.D.)	0 (N.D.～N.D.)	0 (N.D.～N.D.)
DXNs TEQ (pg-TEQ/L)	0.039 (0.039～0.040)	0.042 (0.039～0.046)	0.085 (0.040～0.17)	0.039 (0.039～0.039)	0.051 (0.039～0.17)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

表-73 地点種類別総括表(地下水)

	市街・住宅地域	工業地域	焼却施設 周辺地域	全地域
PBDDs/DFs 総和 (pg/L)	0.073 (0.01～0.23)	0.093 (0.01～0.19)	0.050 (0.02～0.08)	0.074 (0.01～0.23)
MoBPCDDs/DFs 総和 (pg/L)	0 (N.D.～N.D.)	0 (N.D.～N.D.)	0 (N.D.～N.D.)	0 (N.D.～N.D.)
DXNs TEQ (pg-TEQ/L)	0.041 (0.039～0.046)	0.083 (0.039～0.17)	0.040 (0.039～0.040)	0.051 (0.039～0.17)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

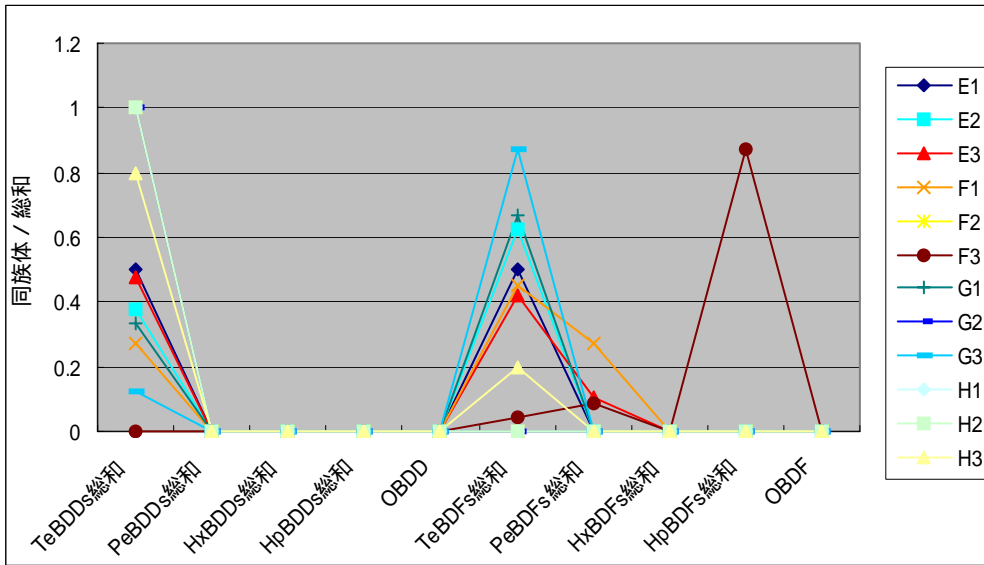


図-46 ポリ臭素化ダイオキシン類同族体分布(地下水)

(5) 水質

水質中の臭素系ダイオキシン類の測定結果を表-74～77に、(塩素化)ダイオキシン類の測定結果を表-78及び79に示した。

表-74 臭素系(全臭素)ダイオキシン類測定結果(水質-1)

単位：pg/L

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	0.2	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	2.1	1.2	N.D.	N.D.	N.D.	0.2
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	N.D.	0.04	0.01	0.01	0.08	0.05
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.28	0.19	0.09	0.04	0.11	0.22
PeBDFs総和	0.46	0.69	N.D.	N.D.	0.10	0.11
HxBDFs総和	2.2	1.4	N.D.	N.D.	0.1	0.2
HpBDFs総和	2.1	1.2	N.D.	N.D.	N.D.	0.2
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	5.0	3.5	0.10	0.05	0.39	0.78

実測濃度が検出下限未満の場合は"N.D."で表示

表-75 臭素系(全臭素)ダイオキシン類測定結果(水質-2)

単位: pg/L

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	0.2	N.D.	1.4	N.D.	1.3	0.9
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	0.04	0.02	0.14	0.12	0.45	0.15
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.80	0.04	0.76	0.18	0.58	0.48
PeBDFs総和	0.17	0.03	0.77	0.14	0.68	0.70
HxBDFs総和	0.2	N.D.	1.2	0.2	1.1	1.0
HpBDFs総和	0.2	N.D.	1.4	N.D.	1.3	0.9
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	1.4	0.09	4.3	0.64	4.1	3.2

実測濃度が検出下限未満の場合は"N.D."で表示

表-76 臭素系(モノ臭素)ダイオキシン類測定結果(水質-1)

単位: pg/L

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	0.03	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	N.D.	0.03	0.5

実測濃度が検出下限未満の場合は"N.D."で表示

表-77 臭素系(モノ臭素)ダイオキシン類測定結果(水質-2)

単位: pg/L

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	0.1
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	0.05	N.D.	0.03	0.10	1.1	0.07
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	0.04	0.01
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	0.02	0.03
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	0.2	N.D.	0.3	N.D.	N.D.	0.1
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	0.01	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	0.03	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	0.25	N.D.	0.33	0.10	1.2	0.21

実測濃度が検出下限未満の場合は"N.D."で表示

表-78 (塩素化)ダイオキシン類測定結果(水質-1)

単位 : pg/L

分析項目		E地域			F地域		
		E1	E2	E3	F1	F2	F3
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,3,6,8-TeCDD	0.56	0.13	0.14	1.9	1.7	3.9
	1,3,7,9-TeCDD	0.31	0.07	0.06	0.63	0.49	1.5
	1,2,3,7,8-PeCDD	(0.02)	N.D.	N.D.	N.D.	N.D.	(0.02)
	1,2,3,4,7,8-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	(0.03)
	1,2,3,6,7,8-HxCDD	(0.04)	N.D.	N.D.	N.D.	N.D.	(0.08)
	1,2,3,7,8,9-HxCDD	(0.05)	N.D.	N.D.	N.D.	N.D.	(0.08)
	1,2,3,4,6,7,8-HpCDD	0.57	0.49	N.D.	0.48	0.68	2.9
	OCDD	5.4	3.8	(0.2)	7.2	11	56
ジベンゾフラン	2,3,7,8-TeCDF	0.046	(0.013)	(0.011)	(0.018)	(0.01)	N.D.
	1,2,7,8-TeCDF	0.06	(0.02)	(0.01)	(0.03)	(0.02)	N.D.
	1,2,3,7,8-PeCDF	0.08	(0.02)	N.D.	(0.02)	N.D.	(0.02)
	2,3,4,7,8-PeCDF	0.06	N.D.	N.D.	(0.03)	N.D.	N.D.
	1,2,3,4,7,8-HxCDF	(0.08)	N.D.	N.D.	N.D.	(0.03)	(0.03)
	1,2,3,6,7,8-HxCDF	(0.06)	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3,4,6,7,8-HxCDF	(0.07)	(0.02)	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,6,7,8-HpCDF	0.29	0.20	(0.02)	0.07	0.10	0.26
	1,2,3,4,7,8,9-HpCDF	(0.04)	N.D.	N.D.	N.D.	N.D.	N.D.
OCDF	0.40	0.39	N.D.	(0.13)	(0.17)	0.87	
コブジナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	0.10	(0.04)	N.D.	(0.04)	N.D.	N.D.
	3,3',4,4'-TeCB(#77)	1.7	1.2	0.26	0.25	0.19	0.19
	3,3',4,4',5-PeCB(#126)	0.21	(0.11)	N.D.	(0.05)	N.D.	N.D.
	3,3',4,4',5,5'-HxCB(#169)	(0.08)	N.D.	N.D.	N.D.	N.D.	N.D.
	モノオルト						
	2',3,4,4',5-PeCB(#123)	0.31	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3',4,4',5-PeCB(#118)	14	10	1.8	1.4	1.7	1.3
	2,3,3',4,4'-PeCB(#105)	6.0	4.0	0.71	0.6	0.7	0.6
	2,3,4,4',5-PeCB(#114)	0.37	0.31	N.D.	N.D.	N.D.	N.D.
	2,3',4,4',5,5'-HxCB(#167)	0.96	0.51	(0.08)	(0.07)	(0.09)	(0.09)
	2,3,3',4,4',5-HxCB(#156)	2.3	1.4	0.20	0.15	0.17	0.18
	2,3,3',4,4',5'-HxCB(#157)	0.60	0.41	N.D.	N.D.	(0.06)	(0.07)
	2,3,3',4,4',5,5'-HpCB(#189)	0.22	0.11	N.D.	N.D.	N.D.	N.D.
TEQ(PCDDs+PCDFs) (pg-TEQ/L)	0.11	0.046	0.038	0.055	0.049	0.10	
TEQ(Co-PCBs) (pg-TEQ/L)	0.026	0.014	0.0026	0.0055	0.0031	0.0030	
TEQ総和(pg-TEQ/L)	0.14	0.060	0.040	0.061	0.052	0.10	
同族体	ダイオキシン						
	TeCDDs総和	1.1	0.24	0.20	2.7	2.5	5.5
	PeCDDs総和	0.45	0.26	0.06	0.33	0.32	0.75
	HxCDDs総和	0.57	0.15	0.05	0.21	0.24	0.67
	HpCDDs総和	1.1	0.97	0.03	0.92	1.3	5.4
	OCDD	5.4	3.8	0.2	7.2	11	56
	PCDDs総和	8.62	5.42	0.54	11.36	15.36	68.32
	ジベンゾフラン						
	TeCDFs総和	1.4	0.41	0.27	0.61	0.48	0.25
	PeCDFs総和	0.97	0.09	N.D.	0.26	0.09	0.13
	HxCDFs総和	0.64	0.06	N.D.	N.D.	0.03	0.23
	HpCDFs総和	0.54	0.29	0.02	0.11	0.18	0.69
	OCDF	0.40	0.39	N.D.	0.13	0.17	0.87
	PCDFs総和	3.95	1.24	0.29	1.11	0.95	2.17
(PCDDs+PCDFs)総和	13	6.7	0.83	12	16	70	

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-79 (塩素化)ダイオキシン類測定結果(水質-2)

単位: pg/L

分析項目		G地域			H地域			
		G1	G2	G3	H1	H2	H3	
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	
	1,3,6,8-TeCDD	2.4	0.88	11	1.5	2.8	2.1	
	1,3,7,9-TeCDD	0.94	0.30	3.7	0.45	1.1	0.71	
	1,2,3,7,8-PeCDD	N.D.	N.D.	(0.05)	N.D.	(0.04)	N.D.	
	1,2,3,4,7,8-HxCDD	N.D.	N.D.	(0.08)	N.D.	(0.04)	N.D.	
	1,2,3,6,7,8-HxCDD	(0.05)	N.D.	0.13	N.D.	0.10	(0.04)	
	1,2,3,7,8,9-HxCDD	(0.06)	N.D.	0.14	N.D.	(0.07)	(0.05)	
	1,2,3,4,6,7,8-HpCDD	1.2	0.44	5.0	0.27	1.4	1.3	
	OCDD	32	15	110	3.5	21	21	
ジベンゾフラン	2,3,7,8-TeCDF	0.034	(0.025)	0.068	0.040	0.056	0.032	
	1,2,7,8-TeCDF	0.04	(0.03)	0.07	0.04	0.08	0.05	
	1,2,3,7,8-PeCDF	(0.06)	(0.03)	0.11	N.D.	0.14	0.07	
	2,3,4,7,8-PeCDF	(0.05)	(0.02)	0.07	N.D.	0.12	(0.04)	
	1,2,3,4,7,8-HxCDF	(0.08)	N.D.	0.25	N.D.	0.18	(0.06)	
	1,2,3,6,7,8-HxCDF	(0.07)	N.D.	0.16	N.D.	0.14	(0.07)	
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	
	2,3,4,6,7,8-HxCDF	0.09	(0.03)	0.15	N.D.	0.20	(0.05)	
	1,2,3,4,6,7,8-HpCDF	0.38	0.12	1.4	0.07	1.0	0.35	
	1,2,3,4,7,8,9-HpCDF	(0.05)	N.D.	0.21	N.D.	(0.06)	(0.03)	
OCDF	0.65	(0.18)	3.4	(0.12)	0.66	0.58		
コブリンナールPCB	3,4,4',5-TeCB(#81)	0.09	(0.04)	0.13	(0.06)	0.13	0.18	
	3,3',4,4'-TeCB(#77)	1.5	0.60	1.9	0.71	2.1	2.2	
	3,3',4,4',5-PeCB(#126)	0.16	(0.06)	0.19	(0.05)	0.20	0.16	
	3,3',4,4',5,5'-HxCB(#169)	N.D.	N.D.	(0.05)	N.D.	(0.05)	N.D.	
	2',3,4,4',5-PeCB(#123)	0.38	N.D.	0.32	0.10	0.29	0.30	
	2,3',4,4',5-PeCB(#118)	17	4.5	16	4.9	12	16	
	2,3,3',4,4'-PeCB(#105)	7.5	1.9	6.0	2.0	5.2	6.5	
	2,3,4,4',5-PeCB(#114)	0.44	N.D.	0.47	0.14	0.41	0.50	
	2,3',4,4',5,5'-HxCB(#167)	0.88	0.26	0.95	0.24	0.72	0.81	
	2,3,3',4,4',5-HxCB(#156)	2.6	0.63	2.3	0.56	1.8	2.0	
2,3,3',4,4',5'-HxCB(#157)	0.66	0.19	0.54	0.14	0.52	0.51		
2,3,3',4,4',5,5'-HxCB(#189)	0.19	N.D.	0.18	(0.05)	0.18	0.14		
TEQ(PCDDs+PCDFs) (pg-TEQ/L)		0.11	0.054	0.28	0.044	0.22	0.096	
TEQ(Co-PCBs) (pg-TEQ/L)		0.021	0.0073	0.024	0.0064	0.024	0.020	
TEQ総和(pg-TEQ/L)		0.13	0.061	0.30	0.050	0.25	0.12	
同族体	ダイオキシン	TeCDDs総和	3.7	1.3	16	2.7	7.3	4.4
	PeCDDs総和	0.73	0.21	2.6	0.25	1.3	0.65	
	HxCDDs総和	0.87	0.25	2.2	0.18	1.3	0.67	
	HpCDDs総和	2.9	1.1	11	0.57	2.8	2.7	
	OCDD	32	15	110	3.5	21	21	
	PCDDs総和	40.2	17.86	141.8	7.2	33.7	29.42	
	ジベンゾフラン	TeCDFs総和	1.3	0.60	2.4	0.39	2.6	1.4
	PeCDFs総和	0.86	0.30	1.7	0.03	2.1	0.80	
	HxCDFs総和	0.78	0.08	2.2	N.D.	1.8	0.57	
	HpCDFs総和	0.82	0.20	3.6	0.11	1.5	0.61	
	OCDF	0.65	0.18	3.4	0.12	0.66	0.58	
	PCDFs総和	4.41	1.36	13.3	0.65	8.66	3.96	
	(PCDDs+PCDFs)総和		45	19	160	7.9	42	33

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

まとめ及び考察

ポリ臭素化ダイオキシン類は、同族体の総和で0.05～5.0 pg/L(平均値2.0 pg/L)の範囲で検出され、E1地点が最も高い濃度を示した。地域別ではE地域が最も高く(表-80)、地点種類別では市街・住宅地域が最も高かった(表-81)。同族体は、TeBDDs、TeBDFs、PeBDFs、HxBDFs及びHpBDFsが検出された(図-47)。2,3,7,8-異性体は、E1、E2、F3、G1、G3、H2及びH3地点から1,2,3,4,6,7,8-HpBDFが検出された。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/240～1/2であった。モノ臭素ポリ塩素化ダイオキシン類同族体総和とポリ臭素化ダイオキシン類同族体総和の相関係数は0.3471であった(図-49)。

モノ臭素ポリ塩素化ダイオキシン類は、同族体の総和でN.D.～1.2 pg/L(平均値0.22 pg/L)の範囲で検出され、H2地点が最も高い濃度を示した。地域別ではH地域が最も高く(表-80)、地点種類別では市街・住宅地域が最も高かった(表-81)。同族体は、MoB-TrCDDsまたはMoB-HpCDDsの割合が高い傾向であった(図-48)。2,3,7,8-異性体では、H3地点から1-MoB-2,3,4,6,7,8,9-HpCDDが検出された。検出されたモノ臭素ポリ塩素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/530～1/35であった。

(塩素化)ダイオキシン類は、0.040～0.30 pg-TEQ/L(平均値0.11 pg-TEQ/L)の範囲で検出され、G3地点が最も高い濃度を示した。地域別ではG地域が最も高く(表-80)、地点種類別では工業地域が最も高かった(表-81)。モノ臭素ポリ塩素化ダイオキシン類同族体総和と塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の相関係数は0.3822であった(図-50)。

表-80 地域別総括表(水質)

	E地域	F地域	G地域	H地域	全地域
PBDDs/DFs 総和 (pg/L)	2.9 (0.10～5.0)	0.41 (0.05～0.78)	1.9 (0.09～4.3)	2.6 (0.64～4.1)	2.0 (0.05～5.0)
MoBPCDDs/DFs 総和 (pg/L)	0 (N.D.～N.D.)	0.18 (N.D.～0.50)	0.19 (N.D.～0.33)	0.50 (0.10～1.2)	0.22 (N.D.～1.2)
DXNs TEQ (pg-TEQ/L)	0.080 (0.040～0.14)	0.071 (0.052～0.10)	0.16 (0.061～0.30)	0.14 (0.050～0.25)	0.11 (0.040～0.30)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

表-81 地点種類別総括表(水質)

	市街・住宅地域	工業地域	焼却施設 周辺地域	全地域
PBDDs/DFs 総和 (pg/L)	2.2 (0.05～5.0)	1.5 (0.09～4.3)	1.9 (0.39～3.5)	2.0 (0.05～5.0)
MoBPCDDs/DFs 総和 (pg/L)	0.32 (N.D.～1.2)	0.11 (N.D.～0.33)	0.015 (N.D.～0.03)	0.22 (N.D.～1.2)
DXNs TEQ (pg-TEQ/L)	0.12 (0.050～0.25)	0.13 (0.040～0.30)	0.056 (0.052～0.060)	0.11 (0.040～0.30)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

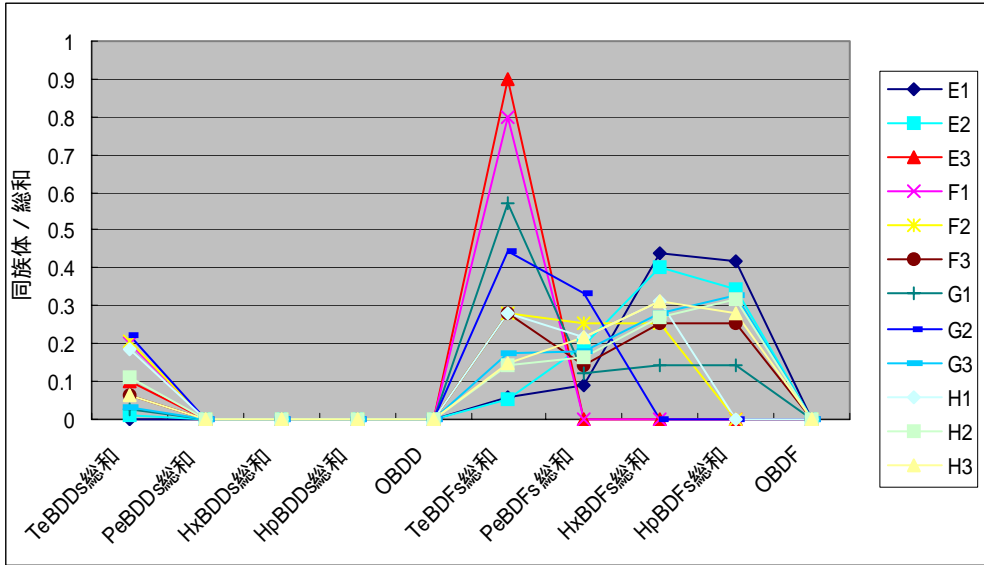


図-47 ポリ臭素化ダイオキシン類同族体分布(水質)

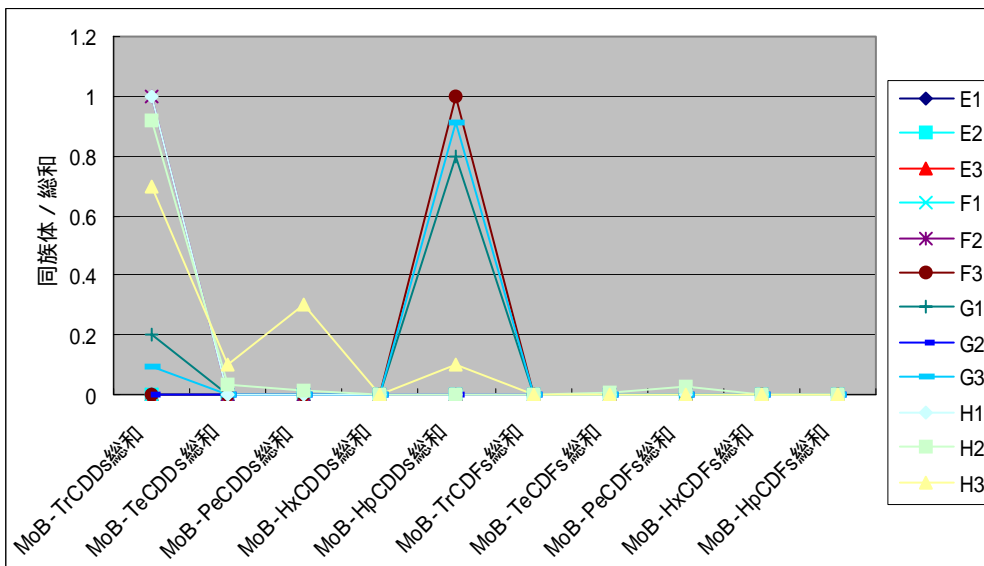


図-48 モノ臭素ポリ塩素化ダイオキシン類同族体分布(水質)

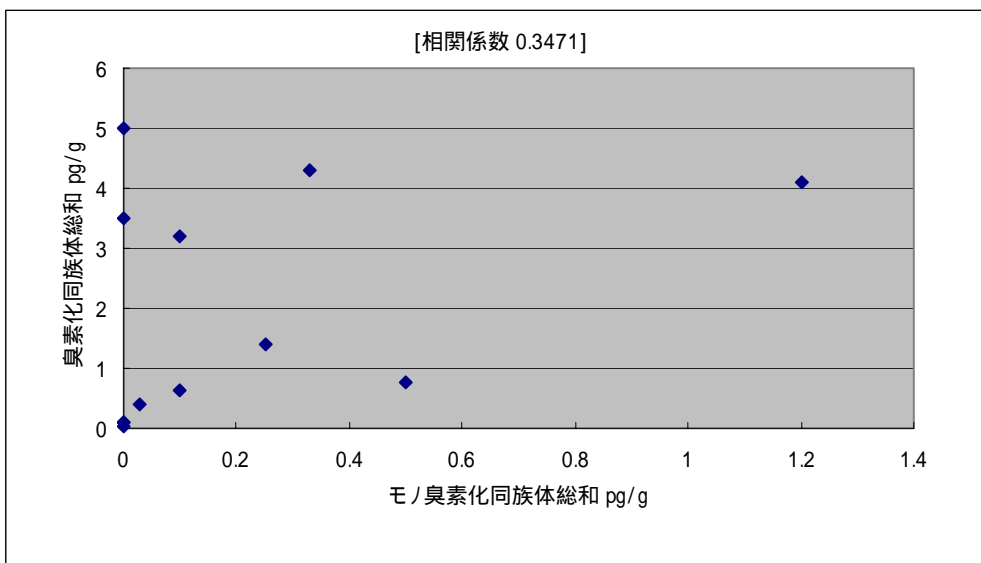


図-49 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ダイオキシン類同族体総和の相関(水質)

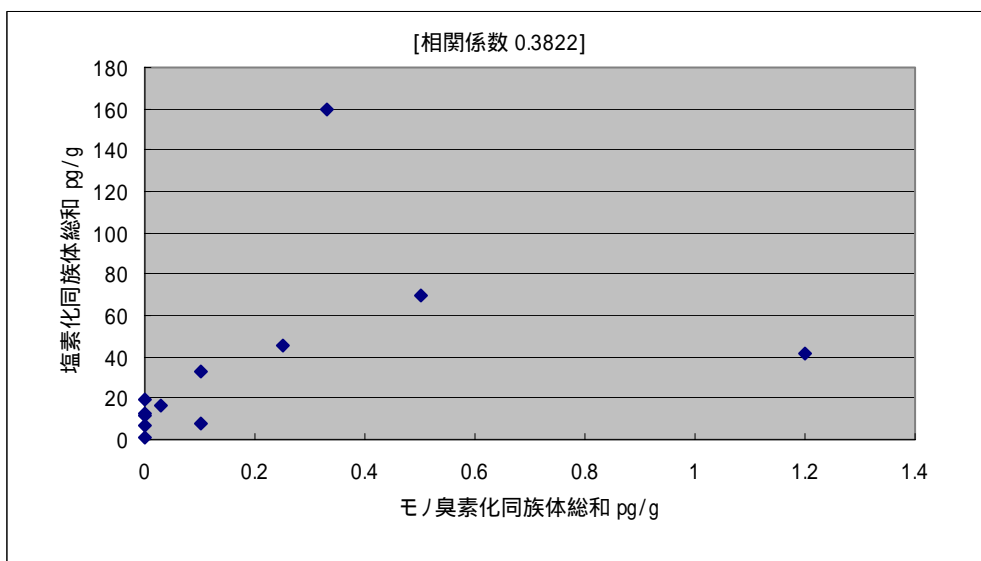


図-50 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
(塩素化)ダイオキシン類同族体総和の相関(水質)

(6) 底質

底質中の臭素系ダイオキシン類の測定結果を表-82～85に、(塩素化)ダイオキシン類の測定結果を表-86及び87に、ポリ臭素化ジフェニルエーテルの測定結果を表-88及び89に示した。

表-82 臭素系(全臭素)ダイオキシン類測定結果(底質-1)

単位：pg/g

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	7	N.D.	N.D.	N.D.	N.D.	9
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	N.D.	1.0	N.D.	0.2	N.D.	1.1
PeBDFs総和	0.6	0.9	N.D.	N.D.	N.D.	5.7
HxBDFs総和	7	2	N.D.	N.D.	N.D.	15
HpBDFs総和	7	N.D.	N.D.	N.D.	N.D.	9
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	15	3.9	N.D.	0.2	N.D.	31

実測濃度が検出下限未満の場合は"N.D."で表示

表-83 臭素系(全臭素)ダイオキシン類測定結果(底質-2)

単位 : pg/g

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	0.2	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	15	N.D.	N.D.	10
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	N.D.	N.D.	0.3	1.2	N.D.	N.D.
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.9	N.D.	5.3	N.D.	2.8	0.9
PeBDFs総和	2.6	N.D.	13	N.D.	4.4	9.2
HxBDFs総和	5	N.D.	22	N.D.	6	16
HpBDFs総和	N.D.	N.D.	15	N.D.	N.D.	10
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	8.5	N.D.	56	1.2	13	36

実測濃度が検出下限未満の場合は"N.D."で表示

表-84 臭素系(モノ臭素)ダイオキシン類測定結果(底質-1)

単位: pg/g

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.2
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	1.5
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	2
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	58
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	4
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	N.D.	N.D.	66

実測濃度が検出下限未満の場合は"N.D."で表示

表-85 臭素系(モノ臭素)ダイオキシン類測定結果(底質-2)

単位: pg/g

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	2.9
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	6.4
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	1
MoB-HpCDDs総和	N.D.	N.D.	3	N.D.	N.D.	9
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	3	N.D.	N.D.	19

実測濃度が検出下限未満の場合は"N.D."で表示

表-86 (塩素化)ダイオキシン類測定結果(底質-1)

単位 : pg/g

分析項目		E地域			F地域		
		E1	E2	E3	F1	F2	F3
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	0.7
	1,3,6,8-TeCDD	3.0	(2.7)	N.D.	11	41	1100
	1,3,7,9-TeCDD	(1.1)	(1.1)	N.D.	3.5	13	430
	1,2,3,7,8-PeCDD	0.23	N.D.	N.D.	(0.15)	(0.18)	6.4
	1,2,3,4,7,8-HxCDD	N.D.	N.D.	N.D.	N.D.	(0.1)	11
	1,2,3,6,7,8-HxCDD	0.33	N.D.	N.D.	(0.19)	0.40	24
	1,2,3,7,8,9-HxCDD	(0.4)	N.D.	N.D.	(0.3)	(0.4)	25
	1,2,3,4,6,7,8-HpCDD	4.5	1.9	N.D.	2.2	8.7	770
	OCDD	48	24	(1.1)	28	130	13000
ジベンゾフラン	2,3,7,8-TeCDF	0.37	(0.14)	N.D.	N.D.	N.D.	3.2
	1,2,7,8-TeCDF	0.31	(0.15)	N.D.	N.D.	(0.14)	3.2
	1,2,3,7,8-PeCDF	0.43	(0.13)	N.D.	N.D.	0.22	5.5
	2,3,4,7,8-PeCDF	0.36	0.17	N.D.	N.D.	0.17	4.5
	1,2,3,4,7,8-HxCDF	0.7	(0.2)	N.D.	(0.1)	(0.3)	11
	1,2,3,6,7,8-HxCDF	0.4	(0.2)	(0.1)	N.D.	(0.2)	8.8
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	1.0
	2,3,4,6,7,8-HxCDF	0.54	(0.17)	0.25	(0.12)	0.28	11
	1,2,3,4,6,7,8-HpCDF	2.1	0.50	N.D.	0.37	1.4	93
	1,2,3,4,7,8,9-HpCDF	(0.22)	N.D.	N.D.	N.D.	(0.19)	12
OCDF	2.2	0.8	N.D.	0.8	2.5	310	
コブジナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	0.86	0.35	N.D.	N.D.	N.D.	3.7
	3,3',4,4'-TeCB(#77)	20	6.2	0.17	0.98	2.3	120
	3,3',4,4',5-PeCB(#126)	1.9	0.43	N.D.	N.D.	0.30	10
	3,3',4,4',5,5'-HxCB(#169)	(0.16)	N.D.	N.D.	N.D.	N.D.	2.6
	モノオルト						
	2',3,4,4',5-PeCB(#123)	4.5	1.2	N.D.	N.D.	0.63	11
	2,3',4,4',5-PeCB(#118)	200	56	1.2	7.5	21	670
	2,3,3',4,4'-PeCB(#105)	85	25	(0.6)	3.3	9.7	240
	2,3,4,4',5-PeCB(#114)	5.0	1.8	N.D.	N.D.	0.54	10
	2,3',4,4',5,5'-HxCB(#167)	13	2.9	N.D.	0.42	1.5	37
	2,3,3',4,4',5-HxCB(#156)	32	7.0	N.D.	1.0	3.2	93
	2,3,3',4,4',5'-HxCB(#157)	8.4	1.8	N.D.	(0.2)	0.9	25
2,3,3',4,4',5,5'-HxCB(#189)	2.3	(0.4)	N.D.	N.D.	(0.3)	8.3	
TEQ(PCDDs+PCDFs) (pg-TEQ/g)		0.83	0.28	0.14	0.32	0.61	29
TEQ(Co-PCBs) (pg-TEQ/g)		0.25	0.058	0.0028	0.0043	0.036	1.2
TEQ総和(pg-TEQ/g)		1.1	0.34	0.15	0.32	0.64	30
同族体	ダイオキシン						
	TeCDDs総和	4.9	4.2	N.D.	15	55	1600
	PeCDDs総和	3.2	1.3	N.D.	2.3	8.3	270
	HxCDDs総和	4.0	1.1	N.D.	2.7	4.2	250
	HpCDDs総和	9.0	3.5	N.D.	4.7	17	1500
	OCDD	48	24	1.1	28	130	13000
	PCDDs総和	69.1	34.1	1.1	52.7	214.5	16620
	ジベンゾフラン						
	TeCDFs総和	7.8	3.1	N.D.	0.37	3.5	110
	PeCDFs総和	5.8	1.9	N.D.	0.13	2.4	89
	HxCDFs総和	4.4	1.2	0.35	0.32	2.6	130
	HpCDFs総和	3.6	0.88	N.D.	0.66	3.0	270
	OCDF	2.2	0.8	N.D.	0.8	2.5	310
	PCDFs総和	23.8	7.88	0.35	2.28	14	909
(PCDDs+PCDFs)総和		93	42	1.5	55	230	18000

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-87 (塩素化)ダイオキシン類測定結果(底質-2)

単位 : pg/g

分析項目		G地域			H地域		
		G1	G2	G3	H1	H2	H3
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	(0.13)	N.D.	N.D.	0.35
	1,3,6,8-TeCDD	39	11	160	(2.4)	37	230
	1,3,7,9-TeCDD	15	3.9	59	N.D.	12	91
	1,2,3,7,8-PeCDD	0.47	(0.13)	0.88	N.D.	0.55	1.7
	1,2,3,4,7,8-HxCDD	0.6	(0.1)	1.2	N.D.	0.6	2.3
	1,2,3,6,7,8-HxCDD	1.2	(0.21)	2.5	(0.12)	1.3	7.3
	1,2,3,7,8,9-HxCDD	1.5	(0.2)	2.3	(0.3)	0.9	5.1
	1,2,3,4,6,7,8-HpCDD	23	2.9	67	3.2	13	190
	OCDD	460	95	1300	110	120	2300
ジベンゾフラン	2,3,7,8-TeCDF	0.61	(0.18)	1.0	N.D.	0.77	2.0
	1,2,7,8-TeCDF	0.66	0.22	1.4	N.D.	0.84	2.3
	1,2,3,7,8-PeCDF	1.1	0.35	1.6	N.D.	1.7	3.3
	2,3,4,7,8-PeCDF	1.1	0.23	1.1	N.D.	2.1	3.0
	1,2,3,4,7,8-HxCDF	1.6	(0.3)	3.4	(0.1)	2.8	4.9
	1,2,3,6,7,8-HxCDF	1.3	0.3	1.9	N.D.	2.5	4.5
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	(0.23)	N.D.	N.D.	0.36
	2,3,4,6,7,8-HxCDF	2.0	N.D.	2.0	N.D.	3.8	5.8
	1,2,3,4,6,7,8-HpCDF	7.9	1.1	19	(0.12)	16	36
	1,2,3,4,7,8,9-HpCDF	1.1	N.D.	3.2	N.D.	1.0	3.8
OCDF	11	1.8	46	N.D.	5.6	200	
コブジナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	2.0	0.27	1.2	(0.13)	4.3	7.3
	3,3',4,4'-TeCB(#77)	42	3.8	19	2.9	170	290
	3,3',4,4',5-PeCB(#126)	5.8	0.42	2.2	0.24	4.0	13
	3,3',4,4',5,5'-HxCB(#169)	0.61	N.D.	0.55	(0.10)	0.91	1.2
	モノオルト						
	2',3,4,4',5-PeCB(#123)	11	0.95	3.0	0.41	7.0	24
	2,3',4,4',5-PeCB(#118)	540	40	130	20	370	1300
	2,3,3',4,4'-PeCB(#105)	220	18	56	8.8	150	500
	2,3,4,4',5-PeCB(#114)	11	0.97	3.3	0.62	10	29
	2,3',4,4',5,5'-HxCB(#167)	33	2.7	10	0.93	11	74
	2,3,3',4,4',5-HxCB(#156)	70	6.2	25	2.3	29	190
	2,3,3',4,4',5'-HxCB(#157)	19	1.9	6.4	(0.5)	7.6	45
	2,3,3',4,4',5,5'-HxCB(#189)	5.3	(0.4)	3.0	N.D.	2.7	15
TEQ(PCDDs+PCDFs) (pg-TEQ/g)	2.4	0.49	4.1	0.20	3.3	9.5	
TEQ(Co-PCBs) (pg-TEQ/g)	0.72	0.053	0.26	0.030	0.50	1.7	
TEQ総和(pg-TEQ/g)	3.1	0.54	4.4	0.23	3.8	11	
同族体	ダイオキシン						
	TeCDDs総和	59	16	230	2.4	54	340
	PeCDDs総和	17	3.5	37	N.D.	13	71
	HxCDDs総和	22	2.6	32	1.9	15	94
	HpCDDs総和	55	6.4	150	9.0	27	460
	OCDD	460	95	1300	110	120	2300
	PCDDs総和	613	123.5	1749	123.3	229	3265
	ジベンゾフラン						
	TeCDFs総和	15	5.1	30	0.21	22	54
	PeCDFs総和	16	4.2	22	0.09	25	48
	HxCDFs総和	17	2.3	30	0.1	27	52
	HpCDFs総和	16	2.1	51	0.12	22	69
	OCDF	11	1.8	46	N.D.	5.6	200
	PCDFs総和	75	15.5	179	0.52	101.6	423
(PCDDs+PCDFs)総和	690	140	1900	120	330	3700	

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-88 ポリ臭素化ジフェニルエーテル測定結果(底質-1)

単位: ng/g

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	0.02
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	N.D.	N.D.	N.D.	N.D.	N.D.	0.016
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4,4'-TrBDE(#28)	N.D.	N.D.	N.D.	N.D.	N.D.	0.007
2,3',4',6-TeBDE(#71)	0.005	0.006	N.D.	N.D.	N.D.	0.011
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.032	0.071	N.D.	N.D.	0.007	0.022
2,3',4,4'-TeBDE(#66)	N.D.	0.005	N.D.	N.D.	N.D.	0.007
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	0.006	0.010	N.D.	N.D.	N.D.	N.D.
2,3',4,4',6-PeBDE(#119)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5-PeBDE(#99)	0.037	0.061	N.D.	N.D.	0.006	0.018
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	N.D.	N.D.	N.D.	N.D.	0.01
2,2',4,4',5,5'-HxBDE(#153)	0.01	N.D.	N.D.	N.D.	N.D.	0.01
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	0.02	N.D.	N.D.	N.D.	N.D.	0.03
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	0.02	N.D.	N.D.	N.D.	N.D.	0.02
2,2',3,4,4',5,5',6-OcBDE(#203)	0.02	N.D.	N.D.	N.D.	N.D.	0.03
2,2',3,3',4,4',5,6'-OcBDE(#196)	0.02	N.D.	N.D.	N.D.	N.D.	0.03
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	0.23	0.03	N.D.	N.D.	0.01	0.16
2,2',3,3',4,4',5,5',6-NoBDE(#206)	0.33	0.03	N.D.	N.D.	N.D.	0.18
DeBDE(#209)	17	0.80	N.D.	0.05	0.18	4.2
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.020
DiBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.039
TrBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.007
TeBDEs 総和	0.037	0.082	N.D.	N.D.	0.007	0.040
PeBDEs 総和	0.043	0.071	N.D.	N.D.	0.006	0.026
HxBDEs 総和	0.01	N.D.	N.D.	N.D.	N.D.	0.04
HpBDEs 総和	0.02	N.D.	N.D.	N.D.	N.D.	0.03
OcBDEs 総和	0.08	N.D.	N.D.	N.D.	N.D.	0.13
NoBDEs 総和	0.71	0.08	N.D.	N.D.	0.01	0.47
DeBDE	17	0.80	N.D.	0.05	0.18	4.2
PBDEs 総和	18	1.0	N.D.	0.05	0.20	5.0

実測濃度が検出下限未満の場合は"N.D."で表示

表-89 ポリ臭素化ジフェニルエーテル測定結果(底質-2)

単位: ng/g

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	0.01
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	N.D.	N.D.	0.016	N.D.	N.D.	0.006
2,2',4-TrBDE(#17)	N.D.	N.D.	0.006	N.D.	N.D.	N.D.
2,4,4'-TrBDE(#28)	N.D.	N.D.	0.017	N.D.	N.D.	0.007
2,3',4',6-TeBDE(#71)	N.D.	N.D.	0.037	N.D.	0.005	0.018
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.005	0.006	0.14	N.D.	0.039	0.047
2,3',4,4'-TeBDE(#66)	N.D.	N.D.	0.022	N.D.	N.D.	0.009
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	N.D.	N.D.	0.023	N.D.	0.006	0.007
2,3',4,4',6-PeBDE(#119)	N.D.	N.D.	0.069	N.D.	N.D.	0.005
2,2',4,4',5-PeBDE(#99)	0.005	N.D.	0.30	N.D.	0.030	0.052
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	0.005	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	N.D.	0.12	N.D.	N.D.	0.03
2,2',4,4',5,5'-HxBDE(#153)	N.D.	N.D.	1.3	N.D.	N.D.	0.02
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	0.03	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	N.D.	0.32	N.D.	0.01	0.03
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	0.01	N.D.	0.09	N.D.	N.D.	0.03
2,2',3,4,4',5,5',6-OcBDE(#203)	0.02	N.D.	0.11	N.D.	N.D.	0.04
2,2',3,3',4,4',5,6'-OcBDE(#196)	0.03	N.D.	0.38	N.D.	0.01	0.05
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	0.33	0.10	0.71	N.D.	0.11	0.64
2,2',3,3',4,4',5,5',6-NoBDE(#206)	0.42	0.10	1.3	N.D.	0.10	0.67
DeBDE(#209)	18	4.8	14	0.04	2.6	18
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.01
DiBDEs 総和	N.D.	N.D.	0.016	N.D.	N.D.	0.013
TrBDEs 総和	N.D.	N.D.	0.023	N.D.	N.D.	0.007
TeBDEs 総和	0.005	0.006	0.21	N.D.	0.044	0.084
PeBDEs 総和	0.005	N.D.	0.43	N.D.	0.036	0.064
HxBDEs 総和	N.D.	N.D.	1.5	N.D.	N.D.	0.08
HpBDEs 総和	N.D.	N.D.	0.34	N.D.	0.01	0.05
OcBDEs 総和	0.07	N.D.	0.64	N.D.	0.03	0.17
NoBDEs 総和	0.98	0.27	2.3	N.D.	0.28	1.7
DeBDE	18	4.8	14	0.04	2.6	18
PBDEs 総和	19	5.1	19	0.04	3.0	20

実測濃度が検出下限未満の場合は"N.D."で表示

まとめ及び考察

ポリ臭素化ダイオキシン類は、同族体の総和でN.D. ~ 56 pg/g(平均値14 pg/g)の範囲で検出され、G3地点が最も高い濃度を示した。地域別ではG地域が最も高く(表-90)、地点種類別では工業地域が最も高かった(表-91)。同族体は、概ねTeBDFs、PeBDFs、HxBDFs及びHpBDFsが主成分である同族体組成であった(図-51)。2,3,7,8-位置換体は、G3地点から2,3,7,8-TeBDFが、E1、F3、G3及びH3地点から1,2,3,4,6,7,8-HpBDFが検出された。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/580 ~ 1/6であった。モノ臭素ポリ塩素化ダイオキシン類同族体総和とポリ臭素化ダイオキシン類同族体総和の相関係数は0.4400であった(図-54)。

モノ臭素ポリ塩素化ダイオキシン類は、同族体の総和でN.D. ~ 66 pg/g(平均値7.3 pg/g)の範囲で検出され、F3地点が最も高い濃度を示した。地域別ではF地域が最も高く(表-90)、地点種類別では市街・住宅地域が最も高かった(表-91)。同族体は、主にMoB-HpCDDsが検出された(図-52)。2,3,7,8-異性体では検出された異性体はなかった。検出されたモノ臭素ポリ塩素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/630 ~ 1/190であった。

(塩素化)ダイオキシン類は、0.15 ~ 30 pg-TEQ/g(平均値4.6 pg-TEQ/g)の範囲で検出され、F3地点が最も高い濃度を示した。地域別ではF地域が最も高く(表-90)、地点種類別では市街・住宅地域が最も高かった(表-91)。モノ臭素ポリ塩素化ダイオキシン類同族体総和と塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の相関係数は0.9937であった(図-55)。

ポリ臭素化ジフェニルエーテルは、同族体の総和でN.D. ~ 20 ng/g(平均値7.5 ng/g)の範囲で検出され、H3地点が最も高い濃度を示した。地域別ではG地域が最も高く(表-90)、地点種類別では市街・住宅地域が最も高かった(表-91)。検出された同族体では、DeBDEが主成分であった(図-53)。ポリ臭素化ダイオキシン類同族体総和との相関係数は0.6784で、正の相関(有意水準5%)が示唆された(図-56)。モノ臭素ポリ塩素化ダイオキシン類同族体総和との相関係数は0.0567であった(図-57)。

表-90 地域別総括表(底質)

	E地域	F地域	G地域	H地域	全地域
PBDDs/DFs 総和 (pg/g)	6.3 (N.D. ~ 15)	10 (N.D. ~ 31)	22 (N.D. ~ 56)	17 (1.2 ~ 36)	14 (N.D. ~ 56)
MoBPCDDs/DFs 総和 (pg/g)	0 (N.D. ~ N.D.)	22 (N.D. ~ 66)	1.0 (N.D. ~ 3)	6.3 (N.D. ~ 19)	7.3 (N.D. ~ 66)
DXNs TEQ (pg-TEQ/g)	0.53 (0.15 ~ 1.1)	10 (0.32 ~ 30)	2.7 (0.54 ~ 4.4)	5.0 (0.23 ~ 11)	4.6 (0.15 ~ 30)
PBDEs 総和 (ng/g)	6.3 (N.D. ~ 18)	1.8 (0.05 ~ 5.0)	14 (5.1 ~ 19)	7.7 (0.04 ~ 20)	7.5 (N.D. ~ 20)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

表-91 地点種類別総括表(底質)

	市街・住宅地域	工業地域	焼却施設 周辺地域	全地域
PBDDs/DFs 総和 (pg/g)	15 (0.2 ~ 36)	19 (N.D. ~ 56)	2.0 (N.D. ~ 3.9)	14 (N.D. ~ 56)
MoBPCDDs/DFs 総和 (pg/g)	12 (N.D. ~ 66)	1.0 (N.D. ~ 3)	0 (N.D. ~ N.D.)	7.3 (N.D. ~ 66)
DXNs TEQ (pg-TEQ/g)	7.1 (0.23 ~ 30)	1.7 (0.15 ~ 4.4)	0.49 (0.34 ~ 0.64)	4.6 (0.15 ~ 30)
PBDEs 総和 (ng/g)	9.3 (0.04 ~ 20)	8.0 (N.D. ~ 19)	0.60 (0.20 ~ 1.0)	7.5 (N.D. ~ 20)

地域ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

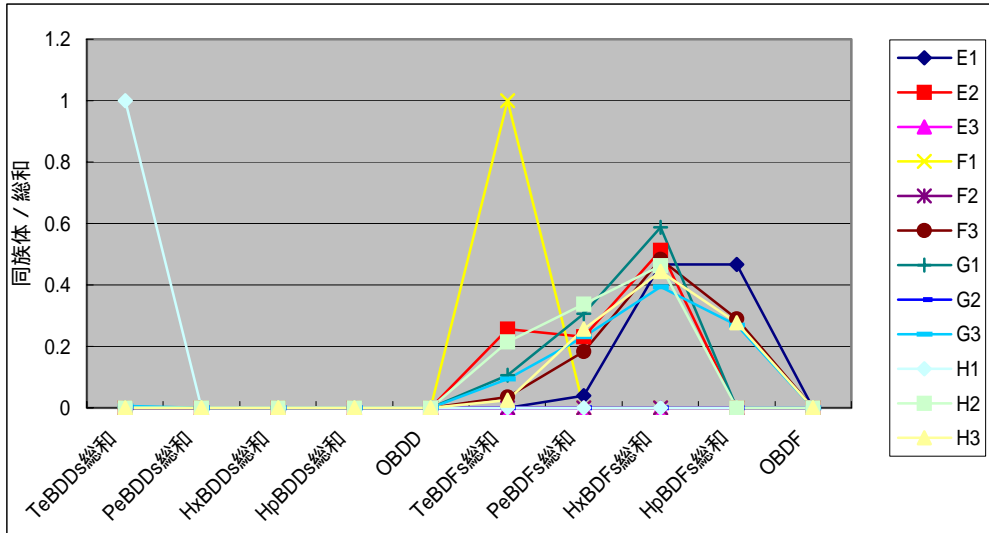


図-51 ポリ臭素化ダイオキシン類同族体分布(底質)

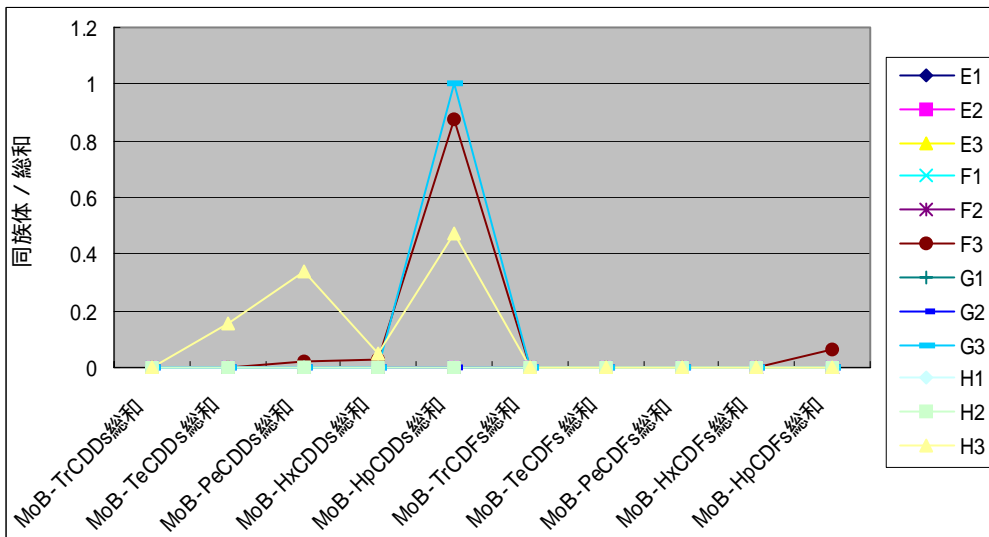


図-52 モノ臭素ポリ塩素化ダイオキシン類同族体分布(底質)

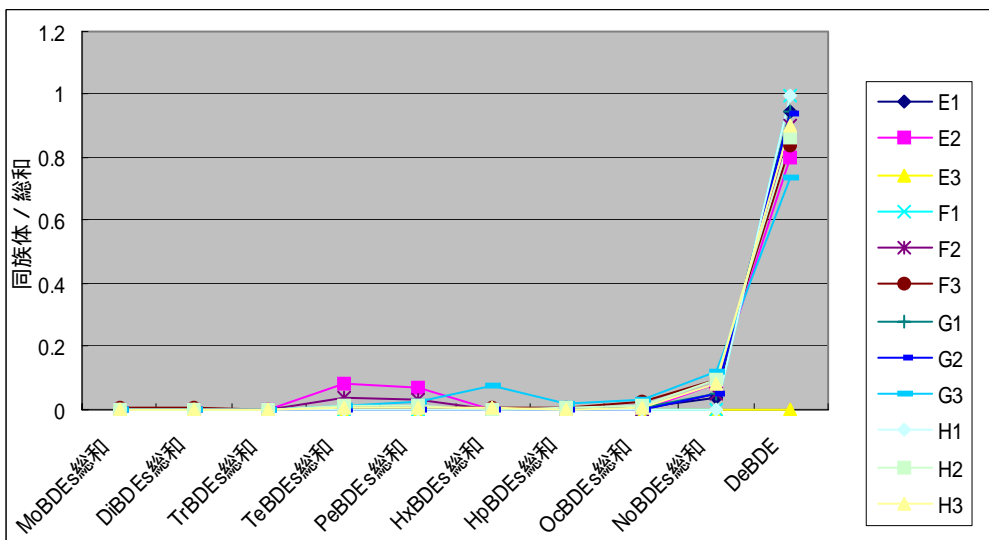


図-53 ポリ臭素化ジフェニルエーテル同族体分布(底質)

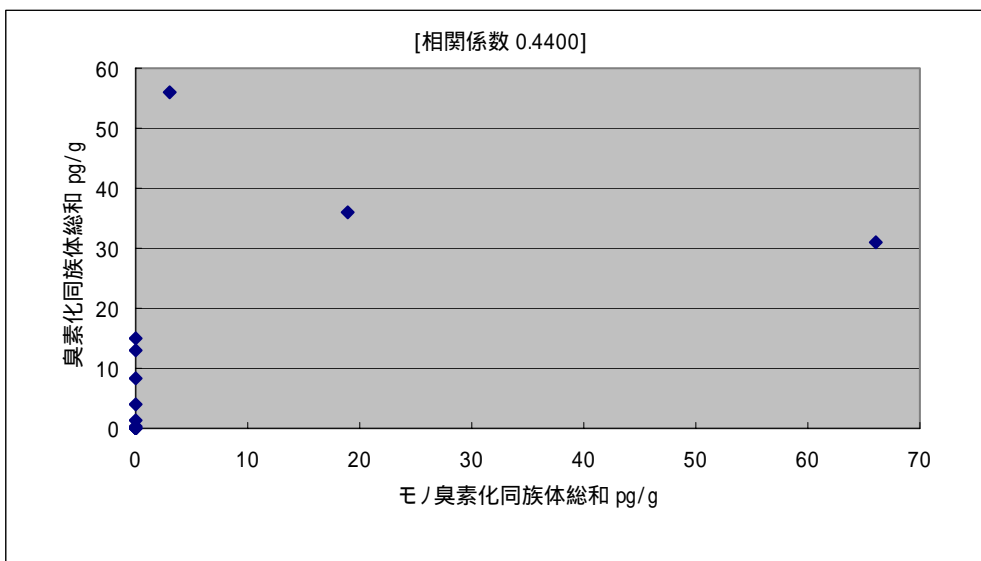


図-54 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ダイオキシン類同族体総和の相関(底質)

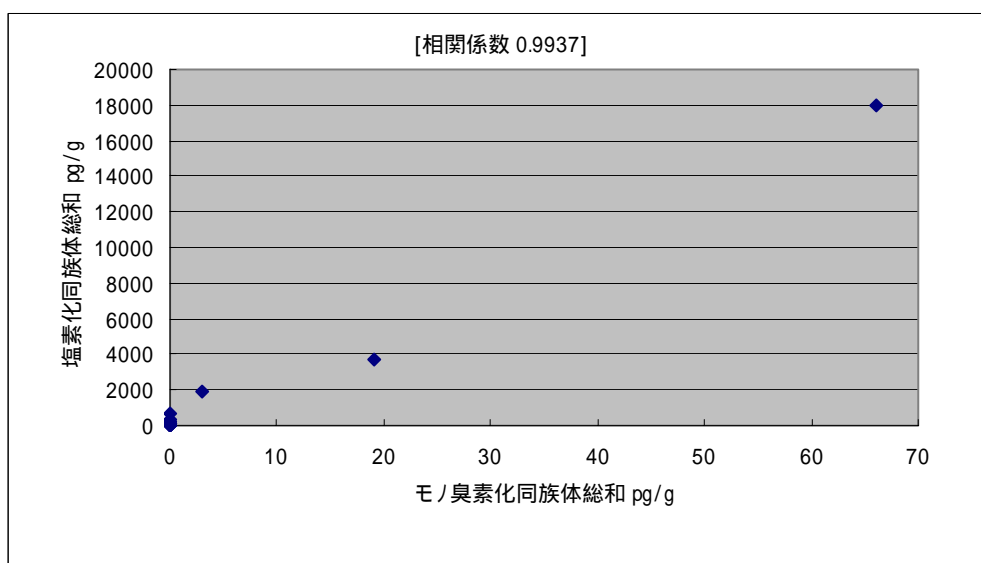


図-55 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
(塩素化)ダイオキシン類同族体総和の相関(底質)

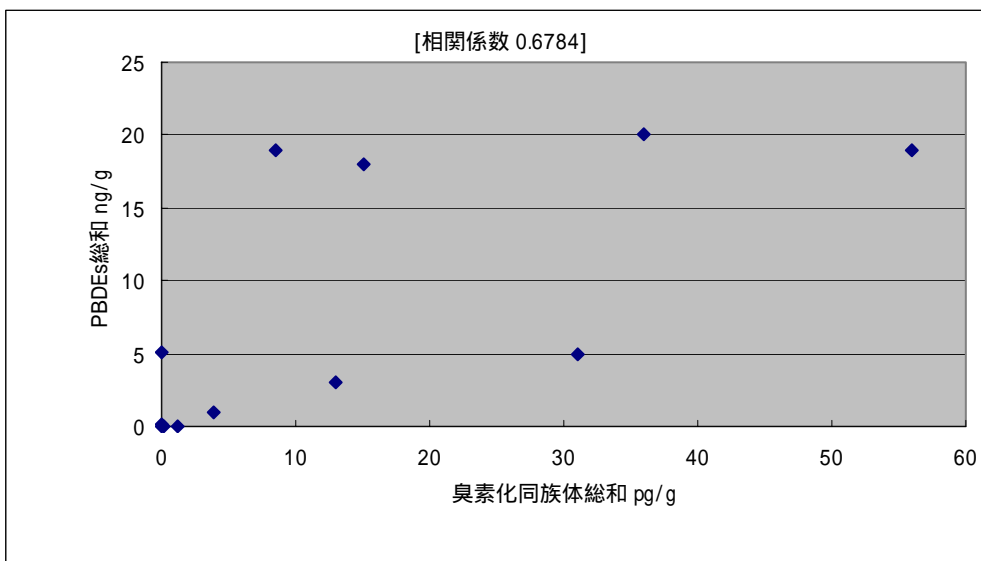


図-56 ポリ臭素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(底質)

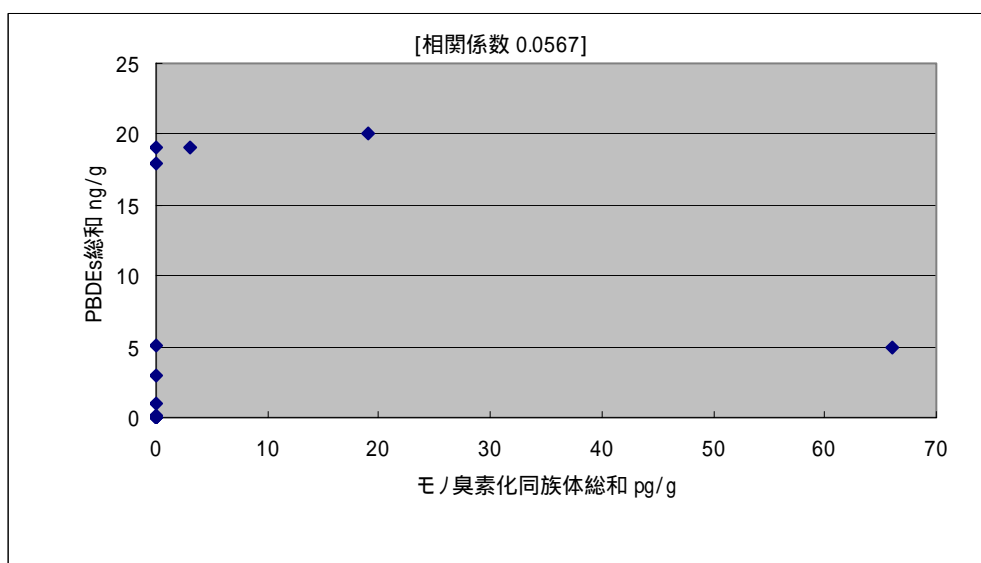


図-57 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(底質)

(7) 水生生物

水生生物の臭素系ダイオキシン類の測定結果を表-92～95に、(塩素化)ダイオキシン類の測定結果を表-96及び97に、ポリ臭素化ジフェニルエーテルの測定結果を表-98及び99に示した。

表-92 臭素系(全臭素)ダイオキシン類測定結果(水生生物-1) 単位：pg/g

分析項目	E 地域			F 地域		
	E1(河川)	E2(河川)	E3(海域)	F1(河川)	F2(河川)	F3(湖沼)
	ウグイ	ウグイ	カレイ	ウグイ	フナ	ワカサギ
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	0.01	N.D.	N.D.	N.D.	N.D.	0.10
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.03	0.01	0.02	N.D.	N.D.	0.40
PeBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	0.04	0.01	0.02	N.D.	N.D.	0.50

実測濃度が検出下限未満の場合は"N.D."で表示

表-93 臭素系(全臭素)ダイオキシン類測定結果(水生生物-2)

単位 : pg/g

分析項目	G 地域			H 地域		
	G1(河川)	G2(河川)	G3(河川)	H1(河川)	H2(河川)	H3(河川)
	クロダイ	コイ	フナ	ボラ	コイ	コイ
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	N.D.	N.D.	N.D.	0.12	0.10	0.01
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.05	0.04	0.02	0.13	0.67	0.08
PeBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	0.05	0.04	0.02	0.25	0.77	0.09

実測濃度が検出下限未満の場合は"N.D."で表示

表-94 臭素系(モノ臭素)ダイオキシン類測定結果(水生生物-1) 単位: pg/g

分析項目	E 地域			F 地域		
	E1(河川)	E2(河川)	E3(海域)	F1(河川)	F2(河川)	F3(湖沼)
	ウグイ	ウグイ	カレイ	ウグイ	フナ	ワカサギ
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.04
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.04

実測濃度が検出下限未満の場合は"N.D."で表示

表-95 臭素系(モノ臭素)ダイオキシン類測定結果(水生生物-2) 単位: pg/g

分析項目	G 地域			H 地域		
	G1(河川)	G2(河川)	G3(河川)	H1(河川)	H2(河川)	H3(河川)
	クロダイ	コイ	フナ	ボラ	コイ	コイ
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	0.01	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	N.D.	0.01	N.D.

実測濃度が検出下限未満の場合は"N.D."で表示

表-96 (塩素化)ダイオキシン類測定結果(水生生物-1)

単位 : pg/g

分析項目		E地域			F地域		
		E1(河川)	E2(河川)	E3(海域)	F1(河川)	F2(河川)	F3(湖沼)
		ウグイ	ウグイ	カレイ	ウグイ	フナ	ワカサギ
ダイオキシン	2,3,7,8-TeCDD	0.030	0.041	N.D.	0.031	0.027	0.13
	1,3,6,8-TeCDD	0.079	(0.013)	(0.012)	0.16	0.18	100
	1,3,7,9-TeCDD	N.D.	N.D.	N.D.	N.D.	(0.013)	2.9
	1,2,3,7,8-PeCDD	0.068	0.069	N.D.	0.066	0.042	0.52
	1,2,3,4,7,8-HxCDD	(0.014)	(0.012)	N.D.	(0.008)	(0.011)	0.15
	1,2,3,6,7,8-HxCDD	0.035	0.025	N.D.	(0.017)	(0.014)	0.55
	1,2,3,7,8,9-HxCDD	(0.011)	N.D.	N.D.	(0.006)	N.D.	0.23
	1,2,3,4,6,7,8-HpCDD	(0.020)	(0.026)	N.D.	0.027	0.038	0.79
	OCDD	(0.06)	0.13	N.D.	0.11	0.18	4.1
ジベンゾフラン	2,3,7,8-TeCDF	0.14	0.14	0.042	0.11	0.034	2.1
	1,2,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	0.022
	1,2,3,7,8-PeCDF	0.025	(0.012)	N.D.	(0.013)	(0.007)	0.24
	2,3,4,7,8-PeCDF	0.078	0.049	(0.007)	0.032	0.029	0.29
	1,2,3,4,7,8-HxCDF	(0.008)	(0.009)	N.D.	N.D.	N.D.	0.061
	1,2,3,6,7,8-HxCDF	(0.007)	N.D.	N.D.	N.D.	N.D.	0.077
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3,4,6,7,8-HxCDF	(0.009)	(0.008)	N.D.	N.D.	N.D.	0.089
	1,2,3,4,6,7,8-HpCDF	N.D.	(0.01)	N.D.	N.D.	N.D.	0.066
	1,2,3,4,7,8,9-HpCDF	N.D.	N.D.	N.D.	N.D.	N.D.	(0.008)
OCDF	N.D.	N.D.	N.D.	N.D.	N.D.	0.07	
コナンテナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	1.4	1.0	0.13	0.94	0.30	4.9
	3,3',4,4'-TeCB(#77)	11	5.4	1.5	7.4	1.5	99
	3,3',4,4',5-PeCB(#126)	3.5	3.5	0.57	2.9	1.2	11
	3,3',4,4',5,5'-HxCB(#169)	0.50	0.58	0.10	0.34	0.10	1.2
	モノオルト						
	2',3,4,4',5-PeCB(#123)	10	15	1.2	6.6	5.1	31
	2,3',4,4',5-PeCB(#118)	590	900	57	320	260	1400
	2,3,3',4,4'-PeCB(#105)	170	230	19	86	86	530
	2,3,4,4',5-PeCB(#114)	9.4	25	1.2	8.7	7.0	29
	2,3',4,4',5,5'-HxCB(#167)	82	80	3.0	30	19	73
	2,3,3',4,4',5-HxCB(#156)	160	150	5.6	57	46	160
	2,3,3',4,4',5'-HxCB(#157)	18	26	1.6	13	11	43
	2,3,3',4,4',5,5'-HpCB(#189)	33	12	(0.5)	7.8	3.3	8.4
TEQ(PCDDs+PCDFs)(pg-TEQ/g)	0.16	0.15	0.0042	0.12	0.087	1.1	
TEQ(Co-PCBs)(pg-TEQ/g)	0.53	0.57	0.070	0.38	0.19	1.4	
TEQ総和(pg-TEQ/g)	0.69	0.72	0.074	0.50	0.28	2.6	
同族体	ダイオキシン						
	TeCDDs総和	0.11	0.054	0.012	0.19	0.22	100
	PeCDDs総和	0.068	0.069	N.D.	0.066	0.042	3.0
	HxCDDs総和	0.060	0.037	N.D.	0.031	0.025	1.8
	HpCDDs総和	0.020	0.026	N.D.	0.027	0.048	1.3
	OCDD	0.06	0.13	N.D.	0.11	0.18	4.1
	PCDDs総和	0.318	0.316	0.012	0.424	0.515	110.2
	ジベンゾフラン						
	TeCDFs総和	0.18	0.14	0.042	0.13	0.063	7.0
	PeCDFs総和	0.14	0.084	0.015	0.064	0.044	2.4
	HxCDFs総和	0.024	0.037	N.D.	N.D.	N.D.	0.60
	HpCDFs総和	N.D.	0.05	N.D.	0.013	N.D.	0.17
	OCDF	N.D.	N.D.	N.D.	N.D.	N.D.	0.07
	PCDFs総和	0.344	0.311	0.057	0.207	0.107	10.24
	(PCDDs+PCDFs)総和	0.66	0.63	0.069	0.63	0.62	120

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-97 (塩素化)ダイオキシン類測定結果(水生生物-2)

単位: pg/g

分析項目		G地域			H地域		
		G1(河川)	G2(河川)	G3(河川)	H1(河川)	H2(河川)	H3(河川)
		クロダイ	コイ	フナ	ボラ	コイ	コイ
ダイオキシン	2,3,7,8-TeCDD	0.079	0.050	0.040	0.28	2.3	0.15
	1,3,6,8-TeCDD	0.10	0.25	0.20	0.35	1.4	0.13
	1,3,7,9-TeCDD	N.D.	N.D.	(0.012)	(0.015)	(0.016)	N.D.
	1,2,3,7,8-PeCDD	0.16	0.15	0.088	0.034	3.3	0.28
	1,2,3,4,7,8-HxCDD	0.020	0.075	0.032	N.D.	1.0	0.10
	1,2,3,6,7,8-HxCDD	0.048	0.11	0.041	(0.010)	2.7	0.23
	1,2,3,7,8,9-HxCDD	(0.018)	0.047	(0.013)	N.D.	0.46	0.059
	1,2,3,4,6,7,8-HpCDD	0.029	0.24	0.072	(0.015)	3.0	0.43
	OCDD	(0.05)	0.43	0.28	0.08	3.9	0.94
ジベンゾフラン	2,3,7,8-TeCDF	0.59	0.70	0.11	0.33	2.8	0.43
	1,2,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	(0.011)	N.D.
	1,2,3,7,8-PeCDF	0.12	0.11	0.029	0.028	2.0	0.11
	2,3,4,7,8-PeCDF	0.52	0.28	0.12	0.11	7.7	0.43
	1,2,3,4,7,8-HxCDF	0.023	0.050	(0.018)	(0.009)	1.1	0.081
	1,2,3,6,7,8-HxCDF	0.028	0.054	(0.013)	(0.007)	1.7	0.10
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	0.043	N.D.
	2,3,4,6,7,8-HxCDF	0.044	0.055	(0.018)	(0.010)	1.9	0.13
	1,2,3,4,6,7,8-HpCDF	N.D.	0.031	N.D.	N.D.	0.83	0.070
	1,2,3,4,7,8,9-HpCDF	N.D.	N.D.	N.D.	N.D.	0.045	N.D.
OCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	
コナンチナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	6.1	1.9	1.0	8.2	61	7.9
	3,3',4,4'-TeCB(#77)	64	39	7.4	97	410	76
	3,3',4,4',5-PeCB(#126)	21	4.6	2.7	7.5	120	15
	3,3',4,4',5,5'-HxCB(#169)	1.1	0.72	0.25	0.45	26	1.8
	モノオルト						
	2',3,4,4',5-PeCB(#123)	68	20	11	48	380	85
	2,3',4,4',5-PeCB(#118)	3800	980	440	2500	19000	5000
	2,3,3',4,4'-PeCB(#105)	1200	370	150	880	7700	1700
	2,3,4,4',5-PeCB(#114)	53	26	11	66	660	120
	2,3',4,4',5,5'-HxCB(#167)	250	58	31	140	850	320
	2,3,3',4,4',5-HxCB(#156)	400	120	67	300	2400	780
	2,3,3',4,4',5'-HxCB(#157)	99	29	17	68	550	160
	2,3,3',4,4',5,5'-HpCB(#189)	40	8.5	5.9	15	200	42
TEQ(PCDDs+PCDFs)(pg-TEQ/g)		0.58	0.46	0.21	0.40	11	0.77
TEQ(Co-PCBs)(pg-TEQ/g)		2.9	0.70	0.38	1.3	17	2.7
TEQ総和(pg-TEQ/g)		3.5	1.2	0.59	1.7	28	3.5
同族体	ダイオキシン						
	TeCDDs総和	0.18	0.30	0.26	0.65	3.7	0.28
	PeCDDs総和	0.16	0.16	0.088	0.034	3.4	0.28
	HxCDDs総和	0.086	0.24	0.086	0.010	4.2	0.39
	HpCDDs総和	0.029	0.24	0.084	0.025	3.0	0.43
	OCDD	0.05	0.43	0.28	0.08	3.9	0.94
	PCDDs総和	0.505	1.37	0.798	0.799	18.2	2.32
	ジベンゾフラン						
	TeCDFs総和	0.69	0.93	0.20	0.59	4.8	0.63
	PeCDFs総和	0.82	0.48	0.22	0.30	14	0.80
	HxCDFs総和	0.13	0.20	0.069	0.026	6.1	0.38
	HpCDFs総和	N.D.	0.031	0.02	N.D.	0.92	0.082
	OCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	PCDFs総和	1.64	1.641	0.509	0.916	25.82	1.892
	(PCDDs+PCDFs)総和		2.1	3.0	1.3	1.7	44

実測濃度が検出下限未満の場合は"N.D.", 検出下限以上定量下限未満の場合は括弧付きで表示

表-98 ポリ臭素化ジフェニルエーテル測定結果(水生生物-1)

単位 : ng/g

分析項目	E 地域			F 地域		
	E1(河川)	E2(河川)	E3(海域)	F1(河川)	F2(河川)	F3(湖沼)
	ウグイ	ウグイ	カレイ	ウグイ	フナ	ワカサギ
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	N.D.	N.D.	N.D.	N.D.	N.D.	0.009
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4,4'-TrBDE(#28)	0.007	0.004	N.D.	0.012	0.009	0.031
2,3',4',6-TeBDE(#71)	0.010	0.009	0.005	0.013	0.013	0.050
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.22	0.31	0.024	0.30	0.17	0.21
2,3',4,4'-TeBDE(#66)	N.D.	N.D.	N.D.	N.D.	N.D.	0.007
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	0.004
2,2',4,4',6-PeBDE(#100)	0.036	0.063	0.003	0.052	0.019	0.022
2,3',4,4',6-PeBDE(#119)	0.003	N.D.	N.D.	0.008	0.004	0.010
2,2',4,4',5-PeBDE(#99)	0.016	N.D.	N.D.	0.002	0.002	0.034
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	0.024	0.043	N.D.	0.049	0.015	0.024
2,2',4,4',5,5'-HxBDE(#153)	0.010	0.005	N.D.	0.019	N.D.	0.012
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	0.006	N.D.	N.D.	0.007	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5,5',6-OcBDE(#203)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6'-OcBDE(#196)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,5',6-NoBDE(#206)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DeBDE(#209)	N.D.	N.D.	N.D.	N.D.	0.01	N.D.
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	0.009
TrBDEs 総和	0.007	0.004	N.D.	0.012	0.009	0.031
TeBDEs 総和	0.23	0.32	0.031	0.31	0.19	0.28
PeBDEs 総和	0.059	0.063	0.003	0.070	0.027	0.073
HxBDEs 総和	0.043	0.071	N.D.	0.090	0.023	0.041
HpBDEs 総和	0.006	N.D.	N.D.	0.013	N.D.	N.D.
OcBDEs 総和	0.018	0.006	N.D.	0.011	N.D.	N.D.
NoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DeBDE	N.D.	N.D.	N.D.	N.D.	0.01	N.D.
PBDEs 総和	0.36	0.46	0.034	0.51	0.26	0.43

実測濃度が検出下限未満の場合は"N.D."で表示

表-99 ポリ臭素化ジフェニルエーテル測定結果(水生生物-2)

単位 : ng/g

分析項目	G 地域			H 地域		
	G1(河川)	G2(河川)	G3(河川)	H1(河川)	H2(河川)	H3(河川)
	クロダイ	コイ	フナ	ボラ	コイ	コイ
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE(#7)	N.D.	N.D.	0.012	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	0.004	0.006	0.022	0.006	0.028	0.013
2,2',4-TrBDE(#17)	N.D.	0.004	0.015	N.D.	N.D.	N.D.
2,4,4'-TrBDE(#28)	0.024	0.023	0.16	0.046	0.36	0.13
2,3',4',6-TeBDE(#71)	0.026	0.024	0.41	0.026	0.28	0.12
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.26	0.28	2.2	0.71	4.6	2.2
2,3',4,4'-TeBDE(#66)	0.014	N.D.	0.013	0.009	0.018	N.D.
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	0.005	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	0.036	0.033	0.17	0.090	0.45	0.27
2,3',4,4',6-PeBDE(#119)	0.009	N.D.	0.092	0.007	0.036	0.026
2,2',4,4',5-PeBDE(#99)	0.005	N.D.	0.11	0.025	0.012	0.016
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	0.029	0.019	1.5	0.045	0.29	0.28
2,2',4,4',5,5'-HxBDE(#153)	0.011	N.D.	2.2	0.023	0.022	0.009
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	N.D.	0.081	0.015	N.D.	N.D.
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	N.D.	N.D.	0.010	N.D.	N.D.	N.D.
2,2',3,4,4',5,5',6-OcBDE(#203)	N.D.	N.D.	0.009	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6'-OcBDE(#196)	N.D.	N.D.	0.005	N.D.	N.D.	N.D.
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,5',6-NoBDE(#206)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DeBDE(#209)	N.D.	N.D.	N.D.	0.02	N.D.	N.D.
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	0.004	0.006	0.040	0.006	0.032	0.013
TrBDEs 総和	0.024	0.027	0.20	0.046	0.36	0.13
TeBDEs 総和	0.30	0.31	3.0	0.75	5.0	2.4
PeBDEs 総和	0.050	0.033	1.8	0.13	0.53	0.42
HxBDEs 総和	0.048	0.024	4.2	0.068	0.49	0.54
HpBDEs 総和	N.D.	N.D.	0.24	0.086	0.066	0.14
OcBDEs 総和	0.010	N.D.	0.14	0.039	0.11	0.22
NoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DeBDE	N.D.	N.D.	N.D.	0.02	N.D.	N.D.
PBDEs 総和	0.44	0.40	9.6	1.1	6.6	3.9

実測濃度が検出下限未満の場合は"N.D."で表示

まとめ及び考察

ポリ臭素化ダイオキシン類は、同族体の総和でN.D. ~ 0.77 pg/g(平均値0.15 pg/g)の範囲で検出され、H2地点のコイが最も高い濃度を示した。同族体は、TeBDDs及びTeBDFsが主に検出された(図-58)。2,3,7,8-異性体で検出されたものはなかった。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/240 ~ 1/3であった。モノ臭素ポリ塩素化ダイオキシン類同族体総和とポリ臭素化ダイオキシン類同族体総和の相関係数は0.6485であった(図-61)。

モノ臭素ポリ塩素化ダイオキシン類は、F3地点のワカサギからMoB-TrCDDsが、H2地点のコイからMoB-TeCDFsが微量検出された以外には検出されなかった(図-59)。検出されたモノ臭素ポリ塩素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/4400 ~ 1/3000であった。

(塩素化)ダイオキシン類は、0.074 ~ 28 pg-TEQ/g(平均値3.6 pg-TEQ/g)の範囲で検出され、H2地点のコイが最も高い濃度を示した。モノ臭素ポリ塩素化ダイオキシン類同族体総和と塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の相関係数は0.9940であった(図-62)。

ポリ臭素化ジフェニルエーテルは、同族体の総和で0.034 ~ 9.6 ng/g(平均値2.0 ng/g)の範囲で検出され、G3地点のフナが最も高い濃度を示した。同族体組成は、G3地点のフナを除きTeBDEsが主成分であり、他の媒体で主成分であったDeBDEIはほとんど検出されなかった(図-60)。G3地点のフナはHxBDEsの割合が最も高かった。ポリ臭素化ダイオキシン類同族体総和及びモノ臭素ポリ塩素化ダイオキシン類同族体総和との相関係数はそれぞれ0.3114及び-0.0435であった(図-63及び64)。

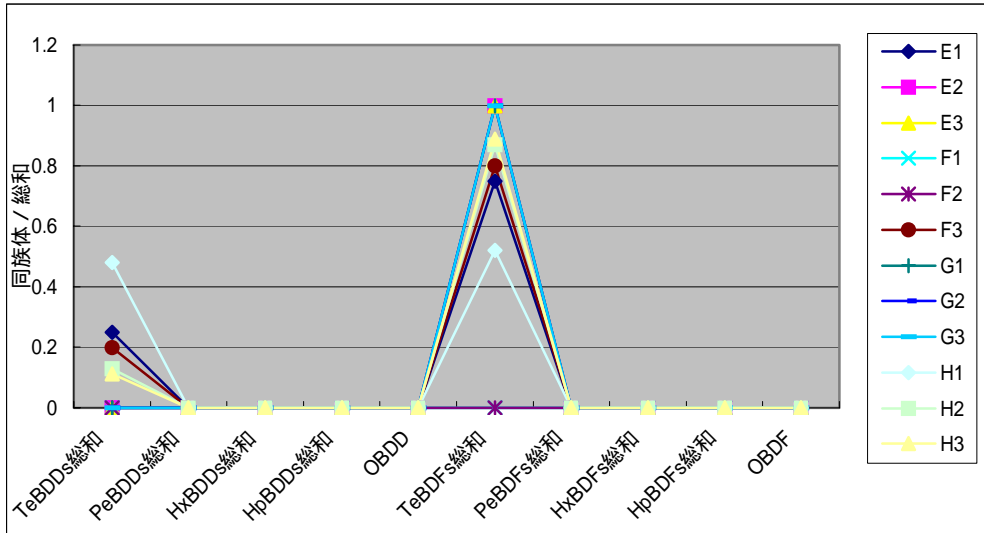


図-58 ポリ臭素化ダイオキシン類同族体分布(水生生物)

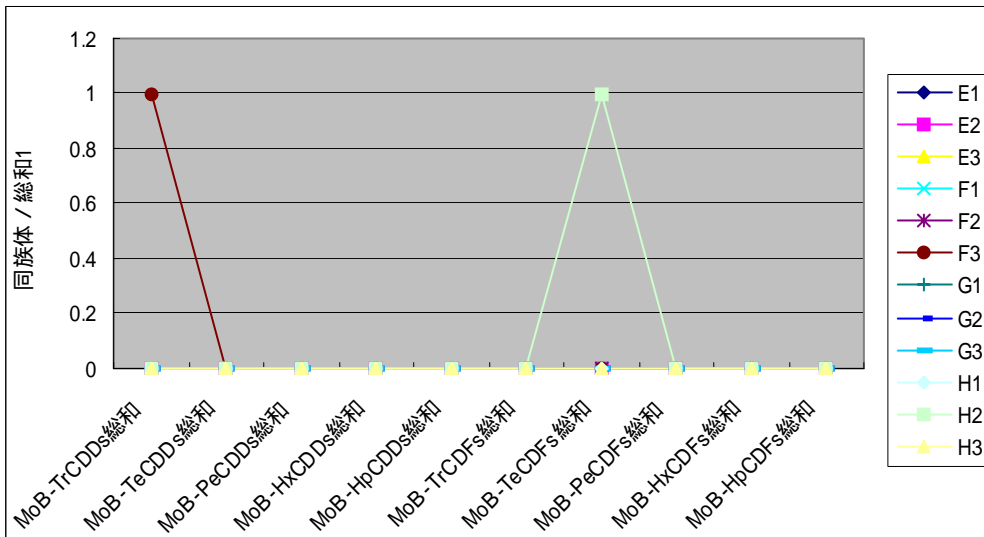


図-59 モノ臭素ポリ塩素化ダイオキシン類同族体分布(水生生物)

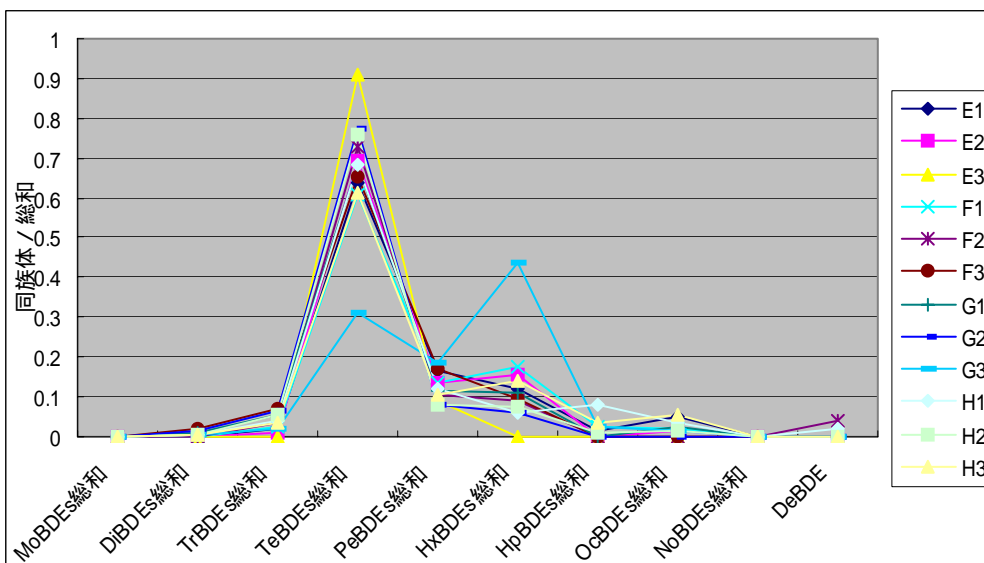


図-60 ポリ臭素化ジフェニルエーテル異性体分布(水生生物)

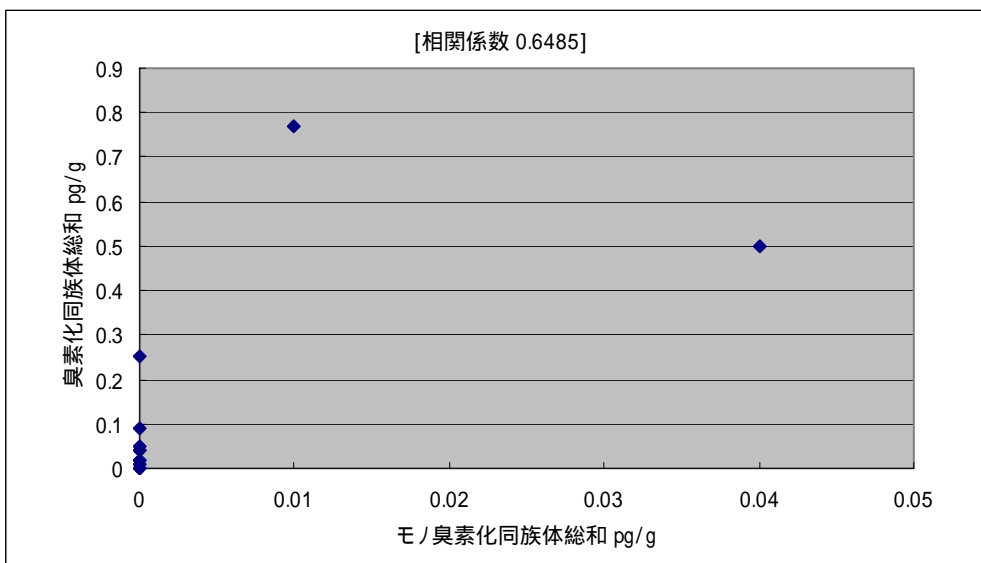


図-61 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ダイオキシン類同族体総和の相関(水生生物)

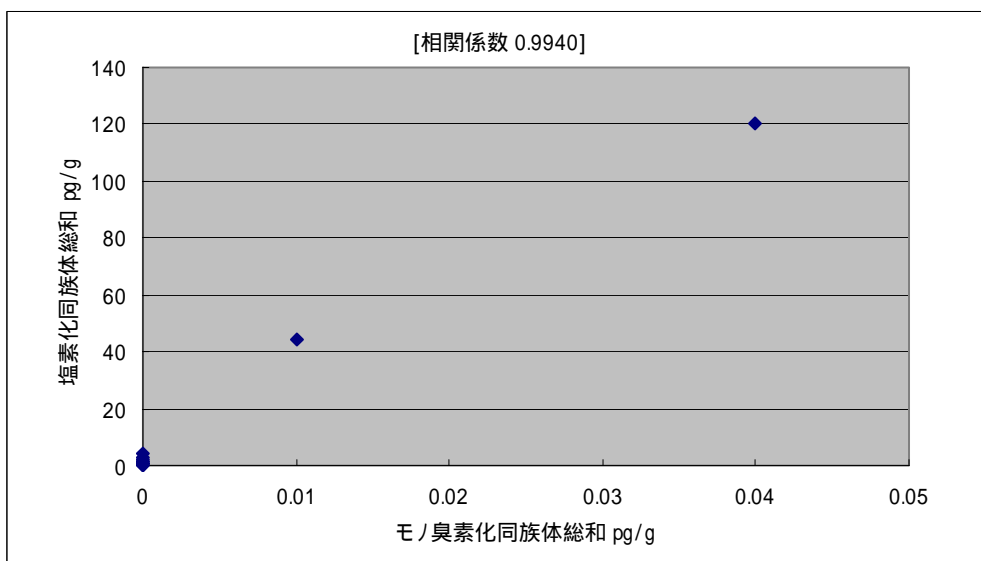


図-62 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
(塩素化)ダイオキシン類同族体総和の相関(水生生物)

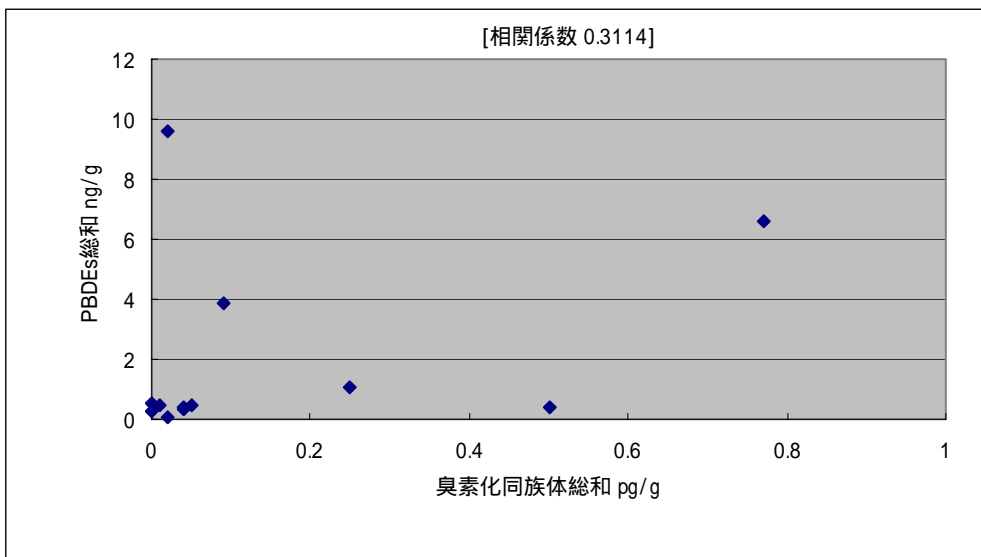


図-63 ポリ臭素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(水生生物)

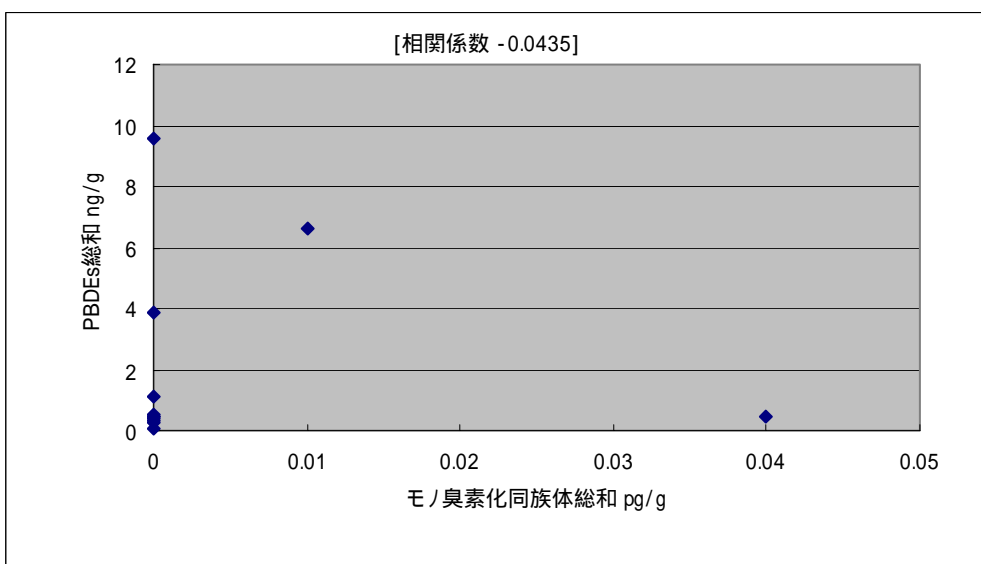


図-64 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(水生生物)

(8) 野生生物

野生生物中の臭素系ダイオキシン類の測定結果を表-100及び101に、(塩素化)ダイオキシン類の測定結果を表-102に、ポリ臭素化ジフェニルエーテルの測定結果を表-103に示した。

表-100 臭素系(全臭素)ダイオキシン類測定結果(野生生物)

単位：pg/g

分析項目	E 地域	F 地域		G 地域		その他
	エゾシカ	ドバト	カモシカ	ドバト	イノシシ	スナメリ
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	0.02	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	0.01	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	N.D.	N.D.	N.D.	N.D.	0.09	3.5
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	N.D.	N.D.	N.D.	N.D.	0.29	4.4
PeBDFs総和	N.D.	N.D.	N.D.	N.D.	0.07	N.D.
HxBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	N.D.	N.D.	N.D.	N.D.	0.45	7.9

実測濃度が検出下限未満の場合は"N.D."で表示

表-101 臭素系(モノ臭素)ダイオキシン類測定結果(野生生物)

単位: pg/g

分析項目	E 地域	F 地域		G 地域		その他
	エゾシカ	ドバト	カモシカ	ドバト	イノシシ	スナメリ
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	0.5	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	0.7	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	N.D.	0.7	N.D.

実測濃度が検出下限未満の場合は"N.D."で表示

表-102 (塩素化)ダイオキシン類測定結果(野生生物)

単位: pg/g

分析項目		E 地域	F 地域		G 地域		その他
		エゾシカ	ドバト	カモシカ	ドバト	イノシシ	スナメリ
ダイオキシン	2,3,7,8-TeCDD	(0.009)	0.13	N.D.	0.013	0.091	0.11
	1,3,6,8-TeCDD	0.023	3.0	N.D.	0.070	2.5	3.2
	1,3,7,9-TeCDD	N.D.	0.79	N.D.	0.017	0.12	(0.13)
	1,2,3,7,8-PeCDD	(0.015)	1.5	(0.006)	0.11	0.67	1.4
	1,2,3,4,7,8-HxCDD	N.D.	1.6	N.D.	0.062	1.3	2.1
	1,2,3,6,7,8-HxCDD	(0.006)	3.7	(0.011)	0.13	2.3	2.1
	1,2,3,7,8,9-HxCDD	N.D.	1.8	N.D.	0.047	0.43	0.52
	1,2,3,4,6,7,8-HpCDD	N.D.	11	(0.021)	0.19	18	7.2
	OCDD	N.D.	42	(0.05)	0.51	210	23
ジベンゾフラン	2,3,7,8-TeCDF	0.008	N.D.	N.D.	N.D.	0.21	1.9
	1,2,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	0.016	0.39
	1,2,3,7,8-PeCDF	N.D.	N.D.	N.D.	N.D.	0.090	1.2
	2,3,4,7,8-PeCDF	0.037	0.20	(0.011)	0.085	1.1	4.6
	1,2,3,4,7,8-HxCDF	(0.007)	0.32	(0.012)	0.051	2.2	2.1
	1,2,3,6,7,8-HxCDF	N.D.	0.25	N.D.	0.033	1.3	1.6
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	(0.019)	0.29
	2,3,4,6,7,8-HxCDF	N.D.	0.28	N.D.	0.042	0.69	2.2
	1,2,3,4,6,7,8-HpCDF	N.D.	0.48	N.D.	(0.027)	3.6	2.8
	1,2,3,4,7,8,9-HpCDF	N.D.	0.056	N.D.	N.D.	0.47	0.95
OCDF	N.D.	0.24	N.D.	N.D.	0.68	1.1	
コブジナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	0.18	N.D.	N.D.	N.D.	0.40	68
	3,3',4,4'-TeCB(#77)	0.14	(0.02)	(0.02)	(0.03)	1.3	510
	3,3',4,4',5-PeCB(#126)	1.2	0.032	0.10	(0.024)	5.9	110
	3,3',4,4',5,5'-HxCB(#169)	0.14	0.12	0.20	0.07	2.8	87
	モノオルト						
	2',3,4,4',5-PeCB(#123)	0.6	0.6	N.D.	3.2	(0.2)	3600
	2,3',4,4',5-PeCB(#118)	61	21	5.3	280	7.0	970000
	2,3,3',4,4'-PeCB(#105)	22	3.7	1.3	160	1.3	110000
	2,3,4,4',5-PeCB(#114)	1.6	3.0	N.D.	6.7	(0.5)	6200
	2,3',4,4',5,5'-HxCB(#167)	3.7	1.4	N.D.	27	0.6	74000
	2,3,3',4,4',5-HxCB(#156)	8.2	24	2.0	64	2.5	43000
	2,3,3',4,4',5'-HxCB(#157)	2.1	3.6	(0.6)	20	(0.5)	14000
	2,3,3',4,4',5,5'-HpCB(#189)	0.8	2.0	1.1	12	0.5	43000
TEQ(PCDDs+PCDFs) (pg-TEQ/g)	0.019	2.6	0	0.20	2.4	5.3	
TEQ(Co-PCBs) (pg-TEQ/g)	0.14	0.022	0.014	0.092	0.62	160	
TEQ総和(pg-TEQ/g)	0.16	2.7	0.014	0.30	3.0	160	
同族体	ダイオキシン						
	TeCDDs総和	0.032	4.0	N.D.	0.10	2.8	4.4
	PeCDDs総和	0.015	1.8	0.006	0.12	1.1	2.3
	HxCDDs総和	0.006	7.2	0.019	0.24	5.2	5.6
	HpCDDs総和	N.D.	11	0.021	0.19	21	7.6
	OCDD	N.D.	42	0.05	0.51	210	23
	PCDDs総和	0.053	66	0.096	1.16	240.1	42.9
	ジベンゾフラン						
	TeCDFs総和	0.027	0.078	N.D.	N.D.	1.2	6.6
	PeCDFs総和	0.037	0.22	0.011	0.085	2.0	18
	HxCDFs総和	0.007	0.88	0.012	0.13	5.0	12
	HpCDFs総和	N.D.	0.59	N.D.	0.027	4.7	8.1
	OCDF	N.D.	0.24	N.D.	N.D.	0.68	1.1
	PCDFs総和	0.071	2.008	0.023	0.242	13.58	45.8
(PCDDs+PCDFs)総和	0.12	68	0.12	1.4	250	89	

実測濃度が検出下限未満の場合は"N.D."、検出下限以上定量下限未満の場合は括弧付きで表示

表-103 ポリ臭素化ジフェニルエーテル測定結果(野生生物)

単位 : ng/g

分析項目	E 地域	F 地域		G 地域		その他
	エゾシカ	ドバト	カモシカ	ドバト	イノシシ	スナメリ
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	N.D.	N.D.	N.D.	N.D.	N.D.	2.6
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	N.D.	N.D.	0.31
2,4,4'-TrBDE(#28)	N.D.	N.D.	N.D.	N.D.	0.002	12
2,3',4',6-TeBDE(#71)	N.D.	N.D.	N.D.	N.D.	N.D.	4.7
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.005	0.033	N.D.	0.022	0.084	470
2,3',4,4'-TeBDE(#66)	N.D.	N.D.	N.D.	N.D.	N.D.	2.3
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	1.3
2,2',4,4',6-PeBDE(#100)	N.D.	0.005	N.D.	0.004	0.015	39
2,3',4,4',6-PeBDE(#119)	N.D.	N.D.	N.D.	N.D.	0.007	11
2,2',4,4',5-PeBDE(#99)	N.D.	0.051	N.D.	0.027	0.047	49
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	0.011	N.D.	N.D.	0.061	69
2,2',4,4',5,5'-HxBDE(#153)	N.D.	0.054	N.D.	0.009	0.97	77
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	0.005	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	0.61
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	0.030	N.D.	0.008	0.067	3.2
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	0.04
2,2',3,3',4,4',6,6'-OcBDE(#197)	N.D.	0.089	N.D.	0.011	0.024	0.39
2,2',3,4,4',5,5',6-OcBDE(#203)	N.D.	N.D.	N.D.	N.D.	0.010	0.04
2,2',3,3',4,4',5,6'-OcBDE(#196)	N.D.	0.023	N.D.	0.005	0.024	0.05
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	N.D.	0.37	N.D.	0.025	0.009	0.03
2,2',3,3',4,4',5,5',6-NoBDE(#206)	N.D.	0.074	N.D.	0.008	N.D.	N.D.
DeBDE(#209)	0.009	1.6	N.D.	0.08	0.02	0.12
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	2.6
TrBDEs 総和	N.D.	N.D.	N.D.	N.D.	0.002	12
TeBDEs 総和	0.005	0.033	N.D.	0.022	0.084	480
PeBDEs 総和	N.D.	0.061	N.D.	0.031	0.086	130
HxBDEs 総和	N.D.	0.065	N.D.	0.009	1.0	170
HpBDEs 総和	N.D.	0.039	N.D.	0.008	0.095	18
OcBDEs 総和	N.D.	0.11	N.D.	0.022	0.074	4.9
NoBDEs 総和	N.D.	0.53	N.D.	0.043	0.009	0.03
DeBDE	0.009	1.6	N.D.	0.08	0.02	0.12
PBDEs 総和	0.014	2.4	N.D.	0.22	1.4	820

実測濃度が検出下限未満の場合は"N.D."で表示

まとめ及び考察

ポリ臭素化ダイオキシン類は、同族体の総和でN.D. ~7.9 pg/g(平均値1.4 pg/g)の範囲で検出され、スナメリが最も高い濃度を示した。G地域イノシシ及びスナメリ以外からは検出されなかった。同族体では、主にTeBDFs、PeBDFs及びTeBDDsが検出された(図-65)。2,3,7,8-異性体は、G地域のイノシシから2,3,7,8-TeBDD及び2,3,7,8-TeBDFが検出された。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/560~1/11であった。モノ臭素ポリ塩素化ダイオキシン類同族体総和とポリ臭素化ダイオキシン類同族体総和の相関係数は-0.1445であった(図-68)。

モノ臭素ポリ塩素化ダイオキシン類は、G地域のイノシシ以外からは検出されなかった。同族体では、MoB-HpCDDsが検出され(図-66)、2,3,7,8-異性体は、1-MoB-2,3,4,6,7,8,9-HpCDDが検出された。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/360であった。

(塩素化)ダイオキシン類は、0.014~160 pg-TEQ/g(平均値0.28 pg-TEQ/g)の範囲で検出され、スナメリが最も高い濃度を示した。モノ臭素ポリ塩素化ダイオキシン類同族体総和と塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の相関係数は0.9170であった(図-69)。

ポリ臭素化ジフェニルエーテルは、総和でN.D. ~820 ng/g(平均値140 ng/g)の範囲で検出され、スナメリが最も高い濃度を示しており、ポリ臭素化ダイオキシン類の濃度と同様の傾向が見られた。異性体組成は、概ね全ての異性体が検出され、地域及び生物種に関わらず、試料によって異性体パターンは大きく異なっていた(図-67)。ポリ臭素化ダイオキシン類同族体総和及びモノ臭素ポリ塩素化ダイオキシン類同族体総和との相関係数はそれぞれ0.9985及び-0.1991であった(図-70及び71)。

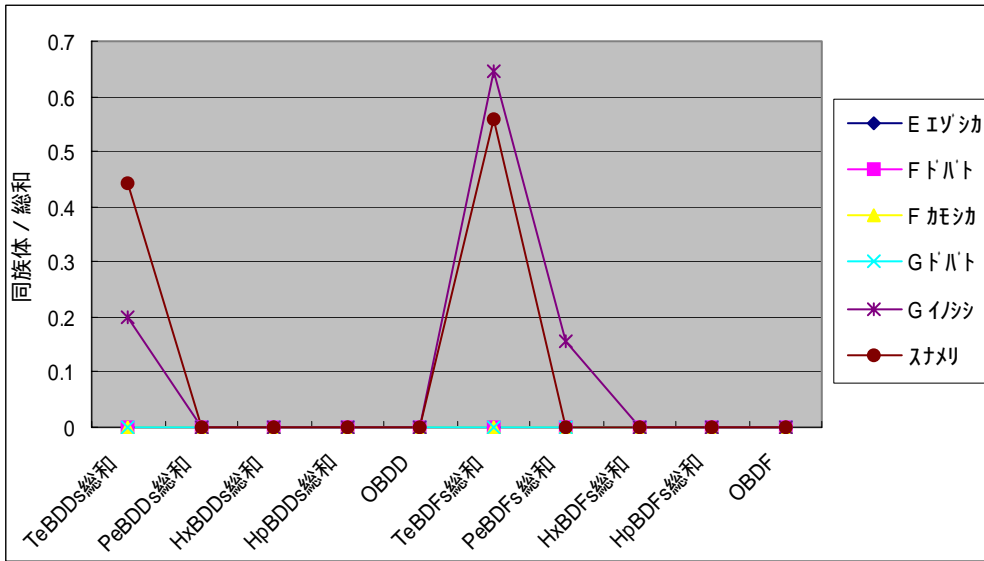


図-65 ポリ臭素化ダイオキシン類同族体分布(野生生物)

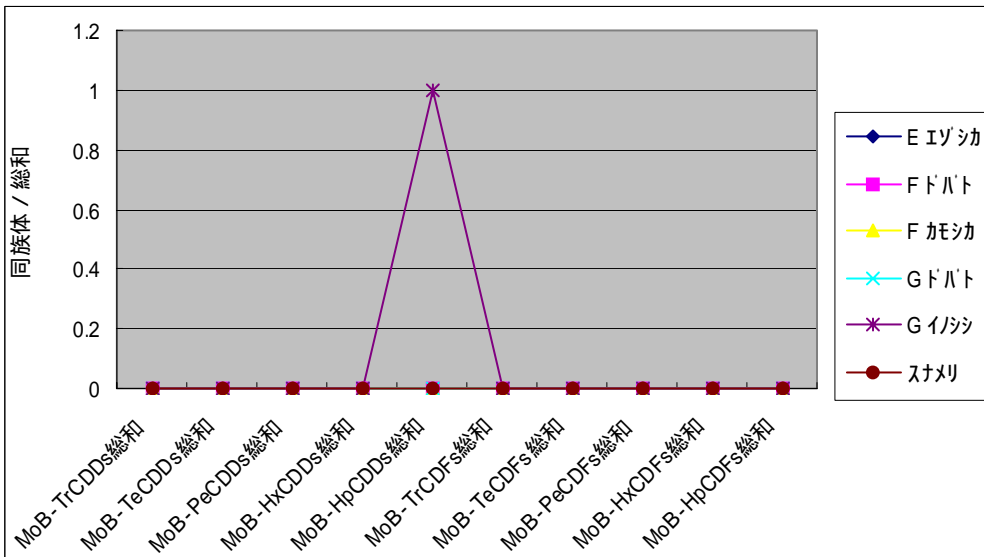


図-66 モノ臭素ポリ塩素化ダイオキシン類同族体分布(野生生物)

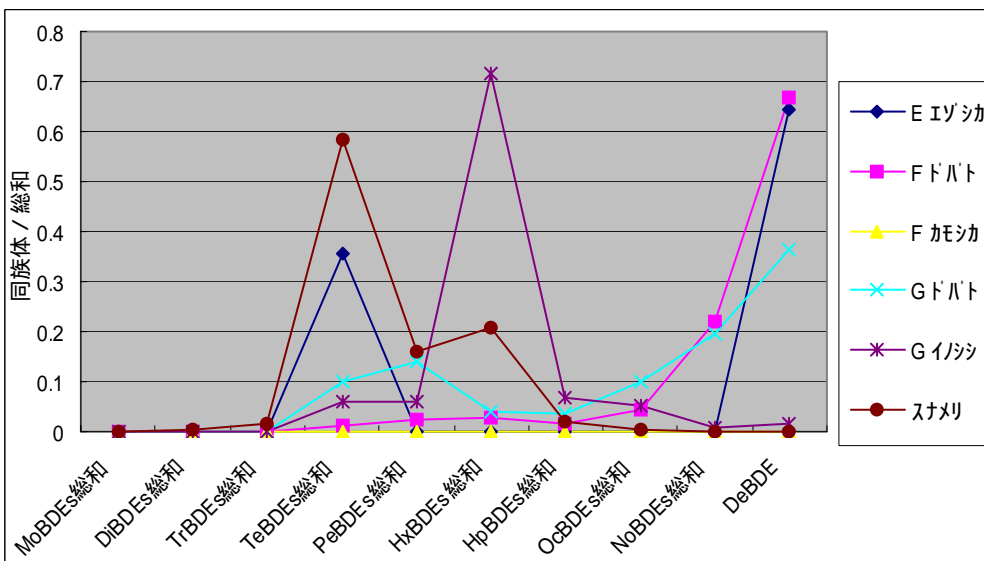


図-67 ポリ臭素化ジフェニルエーテル同族体分布(野生生物)

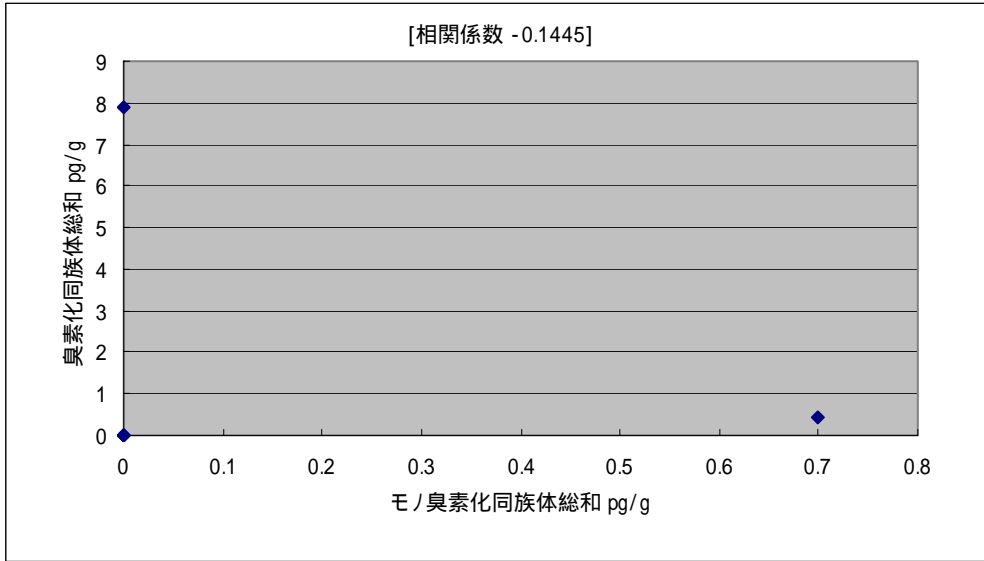


図-68 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ダイオキシン類同族体総和の相関(野生生物)

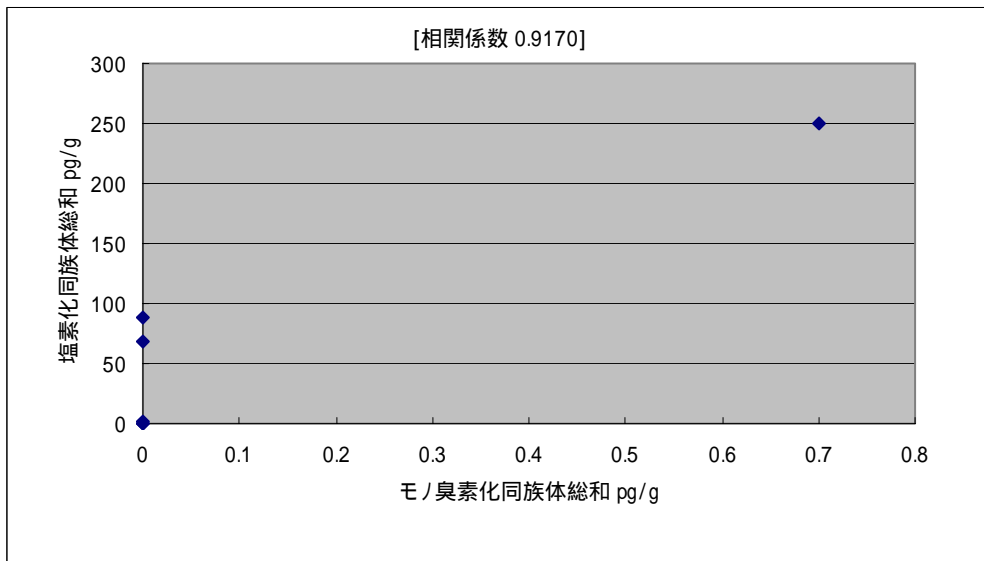


図-69 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
(塩素化)ダイオキシン類同族体総和の相関(野生生物)

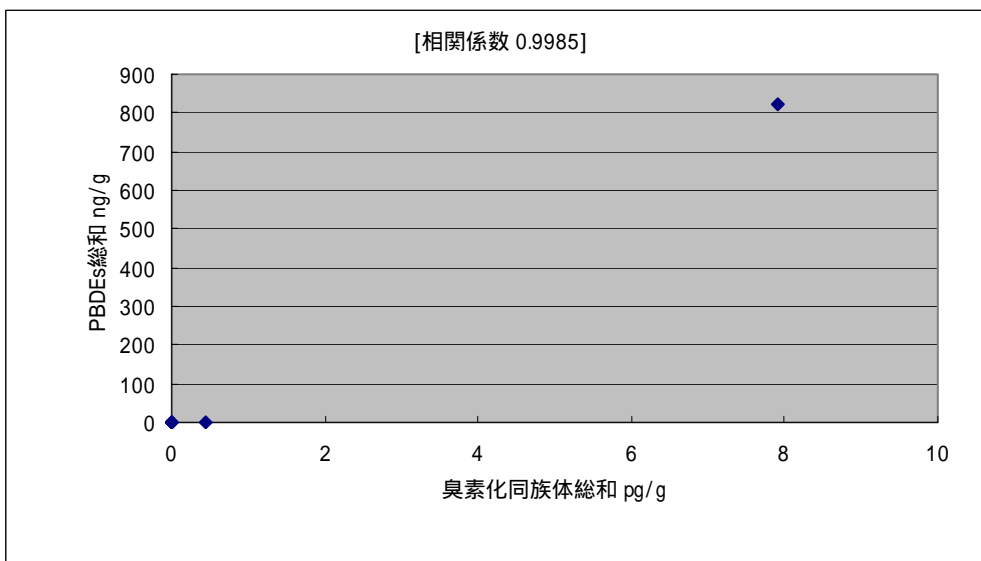


図-70 ポリ臭素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(野生生物)

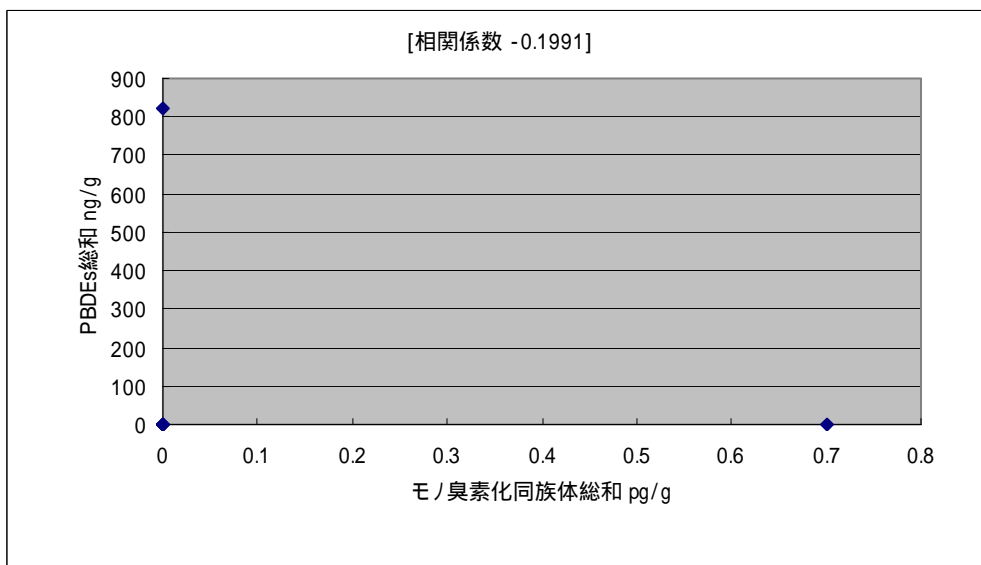


図-71 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(野生生物)

(9) 食事試料

食事試料中の臭素系ダイオキシン類の測定結果を表-104～107に、(塩素系)ダイオキシン類の測定結果を表-108及び109に、ポリ臭素化ジフェニルエーテルの測定結果を表-110及び111に示した。

表-104 臭素系(全臭素)ダイオキシン類測定結果(食事試料-1) 単位：pg/g

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
	28 歳女性	50 歳女性	44 歳女性	58 歳女性	54 歳女性	31 歳女性
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	0.022	0.069	0.026	0.12	0.11	0.069
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.014	0.009	N.D.	0.021	0.003	0.007
PeBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	0.036	0.078	0.026	0.14	0.11	0.076

実測濃度が検出下限未満の場合は"N.D."で表示

表-105 臭素系(全臭素)ダイオキシン類測定結果(食事試料-2)

単位 : pg/g

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
	38 歳女性	61 歳女性	64 歳女性	65 歳男性	66 歳男性	47 歳女性
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	0.007	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,2,3,4,6,7,8-HpBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDDs総和	0.022	0.007	0.064	0.062	0.022	0.044
PeBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	0.037	0.014	0.009	0.026	0.095	0.011
PeBDFs総和	N.D.	N.D.	N.D.	N.D.	0.014	N.D.
HxBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
HpBDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OBDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	0.059	0.021	0.073	0.088	0.13	0.055

実測濃度が検出下限未満の場合は"N.D."で表示

表-106 臭素系(モノ臭素)ダイオキシン類測定結果(食事試料-1) 単位: pg/g

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
	28 歳女性	50 歳女性	44 歳女性	58 歳女性	54 歳女性	31 歳女性
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

実測濃度が検出下限未満の場合は"N.D."で表示

表-107 臭素系(モノ臭素)ダイオキシン類測定結果(食事試料-2) 単位: pg/g

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
	38 歳女性	61 歳女性	64 歳女性	65 歳男性	66 歳男性	47 歳女性
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	0.017	0.004	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	0.017	0.004	N.D.

実測濃度が検出下限未満の場合は"N.D."で表示

表-108 (塩素化)ダイオキシン類測定結果(食事試料-1)

単位 : pg/g

分析項目		E地域			F地域		
		E1	E2	E3	F1	F2	F3
		28歳女性	50歳女性	44歳女性	58歳女性	54歳女性	31歳女性
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,3,6,8-TeCDD	0.038	0.039	0.042	0.18	0.93	0.12
	1,3,7,9-TeCDD	0.010	0.008	0.010	0.052	0.23	0.038
	1,2,3,7,8-PeCDD	N.D.	0.006	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,7,8-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,6,7,8-HxCDD	N.D.	0.007	N.D.	0.007	N.D.	N.D.
	1,2,3,7,8,9-HxCDD	N.D.	0.004	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,6,7,8-HpCDD	0.011	0.026	0.008	0.037	0.018	0.008
	OCDD	0.11	0.15	0.10	0.38	0.16	0.09
ジベンゾフラン	2,3,7,8-TeCDF	0.009	0.013	0.004	0.008	0.012	0.005
	1,2,7,8-TeCDF	N.D.	N.D.	N.D.	0.003	0.004	N.D.
	1,2,3,7,8-PeCDF	N.D.	N.D.	N.D.	0.003	0.004	N.D.
	2,3,4,7,8-PeCDF	N.D.	0.011	0.003	0.006	0.007	N.D.
	1,2,3,4,7,8-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,6,7,8-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3,4,6,7,8-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,6,7,8-HpCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,4,7,8,9-HpCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	
コリナン PCB	ノンオルト						
	3,4,4',5-TeCB(#81)	0.026	0.037	0.013	0.020	0.017	0.011
	3,3',4,4'-TeCB(#77)	0.32	0.50	0.22	0.22	0.25	0.37
	3,3',4,4',5-PeCB(#126)	0.087	0.19	0.074	0.11	0.059	0.086
	3,3',4,4',5,5'-HxCB(#169)	0.011	0.030	0.014	0.029	0.014	0.009
	モノオルト						
	2',3,4,4',5-PeCB(#123)	0.2	0.4	N.D.	N.D.	N.D.	0.2
	2,3',4,4',5-PeCB(#118)	9.6	24	7.6	9.1	12	10
	2,3,3',4,4'-PeCB(#105)	3.2	6.8	2.1	2.8	3.5	3.6
	2,3,4,4',5-PeCB(#114)	0.3	0.5	0.3	0.2	N.D.	N.D.
	2,3',4,4',5,5'-HxCB(#167)	0.4	1.5	0.50	0.8	0.68	0.8
	2,3,3',4,4',5-HxCB(#156)	0.9	3.1	0.9	1.4	1.0	1.3
	2,3,3',4,4',5'-HxCB(#157)	0.2	0.8	0.2	0.3	0.3	0.3
	2,3,3',4,4',5,5'-HpCB(#189)	N.D.	0.3	0.14	N.D.	N.D.	N.D.
TEQ(PCDDs+PCDFs)(pg-TEQ/g)		0.0010	0.014	0.0020	0.0051	0.0051	0.00059
TEQ(Co-PCBs)(pg-TEQ/g)		0.011	0.025	0.0093	0.013	0.0083	0.011
TEQ総和(pg-TEQ/g)		0.012	0.039	0.011	0.019	0.013	0.012
同族体	ダイオキシン						
	TeCDDs総和	0.048	0.047	0.052	0.24	1.2	0.16
	PeCDDs総和	N.D.	0.006	N.D.	0.021	0.067	0.017
	HxCDDs総和	N.D.	0.024	0.004	0.034	0.017	0.007
	HpCDDs総和	0.018	0.034	0.013	0.063	0.031	0.015
	OCDD	0.11	0.15	0.10	0.38	0.16	0.09
	PCDDs総和	0.176	0.261	0.169	0.738	1.475	0.289
	ジベンゾフラン						
	TeCDFs総和	0.015	0.026	0.032	0.085	0.14	0.015
	PeCDFs総和	N.D.	0.011	0.013	0.014	0.029	N.D.
	HxCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	HpCDFs総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	OCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	PCDFs総和	0.015	0.037	0.045	0.099	0.169	0.015
(PCDDs+PCDFs)総和		0.19	0.30	0.21	0.84	1.6	0.30

実測濃度が検出下限未満の場合は"N.D."で表示

表-109 (塩素化)ダイオキシン類測定結果(食事試料-2)

単位: pg/g

分析項目		G地域			H地域		
		G1	G2	G3	H1	H2	H3
		38歳女性	61歳女性	64歳女性	65歳男性	66歳男性	47歳女性
ダイオキシン	2,3,7,8-TeCDD	N.D.	N.D.	0.003	0.002	N.D.	0.002
	1,3,6,8-TeCDD	0.17	0.13	0.072	0.52	0.18	0.17
	1,3,7,9-TeCDD	0.046	0.034	0.021	0.084	0.049	0.036
	1,2,3,7,8-PeCDD	N.D.	N.D.	0.007	0.006	N.D.	0.006
	1,2,3,4,7,8-HxCDD	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1,2,3,6,7,8-HxCDD	N.D.	N.D.	0.006	0.004	0.004	0.005
	1,2,3,7,8,9-HxCDD	N.D.	N.D.	0.003	N.D.	N.D.	N.D.
	1,2,3,4,6,7,8-HpCDD	0.023	0.011	0.025	0.013	0.009	0.013
	OCDD	0.38	0.10	0.15	0.12	0.07	0.22
ジベンゾフラン	2,3,7,8-TeCDF	0.004	0.015	0.015	0.028	0.010	0.059
	1,2,7,8-TeCDF	N.D.	N.D.	N.D.	0.005	0.012	N.D.
	1,2,3,7,8-PeCDF	N.D.	0.004	0.004	0.005	0.010	0.011
	2,3,4,7,8-PeCDF	N.D.	0.007	0.010	0.014	0.013	0.023
	1,2,3,4,7,8-HxCDF	N.D.	N.D.	0.005	N.D.	0.005	N.D.
	1,2,3,6,7,8-HxCDF	N.D.	N.D.	0.003	N.D.	0.005	N.D.
	1,2,3,7,8,9-HxCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	2,3,4,6,7,8-HxCDF	N.D.	0.004	0.003	N.D.	0.004	N.D.
	1,2,3,4,6,7,8-HpCDF	N.D.	N.D.	0.006	N.D.	0.006	N.D.
	1,2,3,4,7,8,9-HpCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	
コニシンナーPCB	ノンオルト						
	3,4,4',5-TeCB(#81)	0.012	0.019	0.084	0.072	0.028	0.036
	3,3',4,4'-TeCB(#77)	0.13	0.32	2.0	1.1	0.28	1.2
	3,3',4,4',5-PeCB(#126)	0.041	0.10	0.34	0.37	0.12	0.46
	3,3',4,4',5,5'-HxCB(#169)	0.010	0.023	0.040	0.046	0.024	0.057
	モノオルト						
	2',3,4,4',5-PeCB(#123)	N.D.	0.20	0.59	0.85	0.16	0.5
	2,3',4,4',5-PeCB(#118)	5.0	12	32	46	7.6	60
	2,3,3',4,4'-PeCB(#105)	1.2	3.7	9.7	14	2.3	17
	2,3,4,4',5-PeCB(#114)	N.D.	0.23	0.70	0.62	0.1	1.5
	2,3',4,4',5,5'-HxCB(#167)	0.4	0.82	2.0	3.4	0.52	4.6
	2,3,3',4,4',5-HxCB(#156)	0.4	1.2	3.7	5.3	0.9	6.4
	2,3,3',4,4',5'-HxCB(#157)	0.1	0.3	0.9	1.3	0.2	1.9
	2,3,3',4,4',5,5'-HpCB(#189)	N.D.	0.15	0.47	0.57	0.12	0.7
TEQ(PCDDs+PCDFs)(pg-TEQ/g)		0.00067	0.0057	0.019	0.019	0.010	0.027
TEQ(Co-PCBs)(pg-TEQ/g)		0.0051	0.013	0.042	0.047	0.014	0.059
TEQ総和(pg-TEQ/g)		0.0058	0.018	0.061	0.066	0.024	0.086
同族体	ダイオキシン						
	TeCDDs総和	0.23	0.18	0.096	0.68	0.24	0.21
	PeCDDs総和	0.014	0.021	0.015	0.046	0.039	0.006
	HxCDDs総和	0.019	0.026	0.019	0.027	0.024	0.014
	HpCDDs総和	0.045	0.027	0.035	0.033	0.017	0.023
	OCDD	0.38	0.10	0.15	0.12	0.07	0.22
	PCDDs総和	0.688	0.354	0.315	0.906	0.39	0.473
	ジベンゾフラン						
	TeCDFs総和	0.039	0.059	0.054	0.18	0.35	0.071
	PeCDFs総和	N.D.	0.026	0.014	0.056	0.13	0.039
	HxCDFs総和	N.D.	0.004	0.011	N.D.	0.027	N.D.
	HpCDFs総和	N.D.	N.D.	0.006	N.D.	0.006	N.D.
	OCDF	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	PCDFs総和	0.039	0.089	0.085	0.236	0.513	0.11
(PCDDs+PCDFs)総和		0.73	0.44	0.40	1.1	0.90	0.58

実測濃度が検出下限未満の場合は"N.D."で表示

表-110 ポリ臭素化ジフェニルエーテル測定結果(食事試料-1)

単位 : ng/g

分析項目	E 地域			F 地域		
	E1	E2	E3	F1	F2	F3
	28 歳女性	50 歳女性	44 歳女性	58 歳女性	54 歳女性	31 歳女性
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4,4'-TrBDE(#28)	N.D.	0.003	0.001	N.D.	N.D.	0.001
2,3',4',6-TeBDE(#71)	N.D.	0.010	0.002	N.D.	0.001	0.003
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.005	0.041	0.015	0.006	0.009	0.013
2,3',4,4'-TeBDE(#66)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	N.D.	0.009	0.003	0.002	0.002	0.003
2,3',4,4',6-PeBDE(#119)	N.D.	0.002	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5-PeBDE(#99)	0.004	0.008	0.005	0.004	0.003	0.003
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	0.008	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,5'-HxBDE(#153)	N.D.	0.002	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5,5',6-OcBDE(#203)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6'-OcBDE(#196)	0.003	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	0.006	0.002	N.D.	N.D.	N.D.	0.002
2,2',3,3',4,4',5,5',6-NoBDE(#206)	0.010	0.002	N.D.	N.D.	N.D.	N.D.
DeBDE(#209)	0.056	0.016	0.015	0.024	0.019	0.017
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TrBDEs 総和	N.D.	0.003	0.001	N.D.	N.D.	0.001
TeBDEs 総和	0.005	0.051	0.017	0.006	0.010	0.016
PeBDEs 総和	0.004	0.021	0.008	0.006	0.005	0.006
HxBDEs 総和	N.D.	0.010	N.D.	N.D.	N.D.	N.D.
HpBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OcBDEs 総和	0.003	N.D.	N.D.	N.D.	N.D.	N.D.
NoBDEs 総和	0.016	0.004	N.D.	N.D.	N.D.	0.002
DeBDE	0.056	0.016	0.015	0.024	0.019	0.017
PBDEs 総和	0.084	0.11	0.041	0.036	0.034	0.042

実測濃度が検出下限未満の場合は"N.D."で表示

表-111 ポリ臭素化ジフェニルエーテル測定結果(食事試料-2)

単位 : ng/g

分析項目	G 地域			H 地域		
	G1	G2	G3	H1	H2	H3
	38 歳女性	61 歳女性	64 歳女性	65 歳男性	66 歳男性	47 歳女性
4-MoBDE(#3)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE(#7)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE(#15)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4-TrBDE(#17)	N.D.	N.D.	N.D.	N.D.	N.D.	0.002
2,4,4'-TrBDE(#28)	N.D.	0.001	0.003	0.005	N.D.	0.003
2,3',4',6-TeBDE(#71)	N.D.	0.003	0.010	0.015	0.004	0.014
2,2',4,5'-TeBDE(#49)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE(#47)	0.006	0.011	0.047	0.066	0.015	0.047
2,3',4,4'-TeBDE(#66)	N.D.	N.D.	0.004	0.004	0.002	0.002
3,3',4,4'-TeBDE(#77)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE(#100)	0.002	0.002	0.010	0.015	0.003	0.009
2,3',4,4',6-PeBDE(#119)	N.D.	N.D.	0.002	0.002	N.D.	N.D.
2,2',4,4',5-PeBDE(#99)	0.005	0.002	0.016	0.008	0.008	0.007
2,2',3,4,4'-PeBDE(#85)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE(#126)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE(#154)	N.D.	0.002	0.007	0.009	0.004	0.004
2,2',4,4',5,5'-HxBDE(#153)	N.D.	N.D.	0.003	0.002	N.D.	N.D.
2,2',3,4,4',5'-HxBDE(#138)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE(#156)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE(#184)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6-HpBDE(#183)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5',6-HpBDE(#191)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcBDE(#197)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5,5',6-OcBDE(#203)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6'-OcBDE(#196)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5,5',6-OcBDE(#205)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE(#207)	N.D.	0.002	0.002	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,5',6-NoBDE(#206)	N.D.	N.D.	N.D.	0.003	N.D.	N.D.
DeBDE(#209)	0.022	0.018	0.037	0.015	0.018	0.033
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
TrBDEs 総和	N.D.	0.001	0.003	0.005	N.D.	0.005
TeBDEs 総和	0.006	0.014	0.061	0.087	0.021	0.067
PeBDEs 総和	0.007	0.004	0.030	0.027	0.013	0.018
HxBDEs 総和	N.D.	0.002	0.012	0.014	0.004	0.004
HpBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
OcBDEs 総和	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
NoBDEs 総和	N.D.	0.002	0.002	0.003	N.D.	N.D.
DeBDE	0.022	0.018	0.037	0.015	0.018	0.033
PBDEs 総和	0.035	0.041	0.15	0.15	0.056	0.13

実測濃度が検出下限未満の場合は"N.D."で表示

まとめ及び考察

ポリ臭素化ダイオキシン類は、同族体の総和で0.021～0.14 pg/g(平均値0.074 pg/g)の範囲で検出され、F1試料が最も高い濃度を示した。同族体は、TeBDDs及びTeBDFsが主に検出され、H2試料からはPeBDFsが検出された(図-72)。2,3,7,8-異性体では、G1試料から2,3,7,8-TeBDFが検出された。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/21～1/4であった。モノ臭素ポリ塩素化ダイオキシン類同族体総和とポリ臭素化ダイオキシン類同族体総和の相関係数は0.2186であった(図-75)。

モノ臭素ポリ塩素化ダイオキシン類は、H1及びH2試料以外からは検出されなかった。同族体では、MoB-TrCDDsが検出され(図-73)、2,3,7,8-異性体は検出されなかった。検出されたポリ臭素化ダイオキシン類同族体総和は、塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の約1/230～1/65であった。

(塩素化)ダイオキシン類は、0.0058～0.086 pg-TEQ/g(平均値0.031 pg-TEQ/g)の範囲で検出され、H3試料が最も高い濃度を示した。モノ臭素ポリ塩素化ダイオキシン類同族体総和と塩素化ダイオキシン類(PCDDs及びPCDFs)同族体総和の相関係数は0.3925であった(図-76)。また、今回の結果から算出した一日摂取量及び耐容一日摂取量(TDI)に対する比率を表-112及び113に示した。一日摂取量がTDI(4 pg-TEQ/kg/day)を超えていた試料はなかった。

ポリ臭素化ジフェニルエーテルは、総和で0.034～0.15 ng/g(平均値0.076 ng/g)の範囲で検出され、G3及びH1試料が最も高い濃度を示した。同族体の組成は、TeBDEs及びDeBDEが相対的に高い組成を示した(図-74)。ポリ臭素化ダイオキシン類同族体総和及びモノ臭素ポリ塩素化ダイオキシン類同族体総和との相関係数はそれぞれ-0.0720及び0.4650であった(図-77及び78)。

表-112 塩素化ダイオキシン類の一日摂取量及び耐容一日摂取量(TDI)に対する比率

	E地域			F地域		
	E1	E2	E3	F1	F2	F3
	28歳女性	50歳女性	44歳女性	58歳女性	54歳女性	31歳女性
体重(kg)	50	49	43	56	53	45
食事摂取量(g) ^{*1}	4463	7267	6831	6166	7321	5112
TEQ(pg-TEQ/g)	0.012	0.039	0.011	0.019	0.013	0.012
ダイオキシン類摂取量(pg-TEQ) ^{*1}	53.556	283.413	75.141	117.154	95.173	61.344
一日摂取量(pg-TEQ/kg/day)	0.357	1.928	0.582	0.697	0.599	0.454
TDI ^{*2} に対する比率(%)	8.9	48	15	17	15	11

*1 3日間の総量

*2 4 pg-TEQ/kg/day

表-113 塩素化ダイオキシン類の一日摂取量及び耐容一日摂取量(TDI)に対する比率

	G地域			H地域		
	G1	G2	G3	H1	H2	H3
	38歳女性	61歳女性	64歳女性	65歳男性	66歳男性	47歳女性
体重(kg)	50	52	51	53	70	53
食事摂取量(g) ^{*1}	4779	6937	8208	7220	6623	4765
TEQ(pg-TEQ/g)	0.0058	0.018	0.061	0.066	0.024	0.086
ダイオキシン類摂取量(pg-TEQ) ^{*1}	27.7182	124.866	500.688	476.52	158.952	409.79
一日摂取量(pg-TEQ/kg/day)	0.185	0.800	3.272	2.997	0.757	2.577
TDI ^{*2} に対する比率(%)	4.6	20	82	75	19	64

*1 3日間の総量

*2 4 pg-TEQ/kg/day

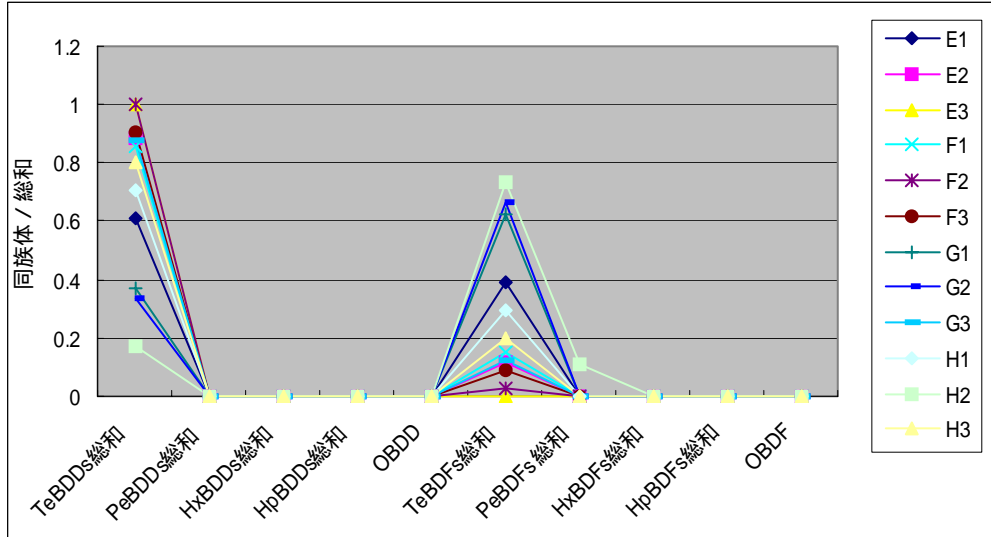


図-72 ポリ臭素化ダイオキシン類同族体分布(食事試料)

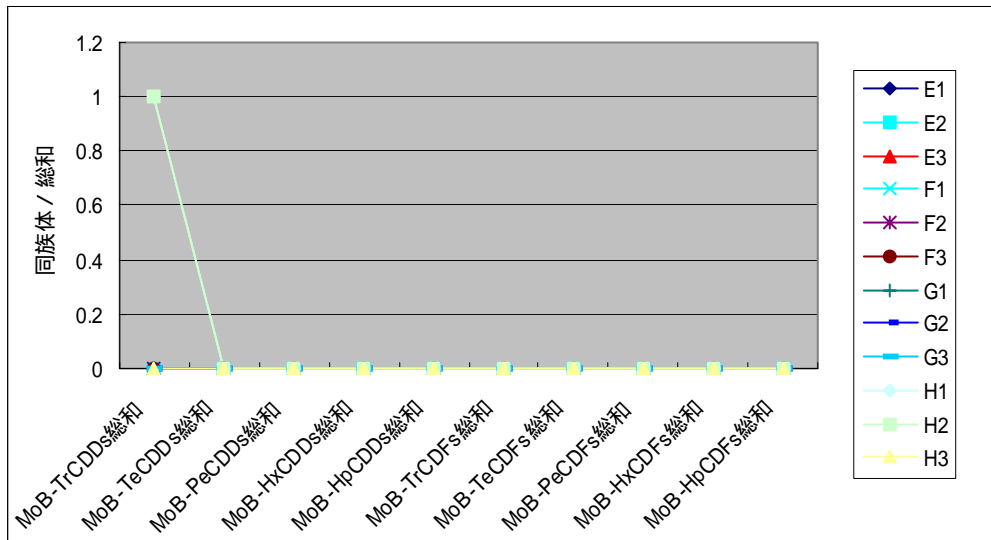


図-73 モノ臭素ポリ塩素化ダイオキシン類同族体分布(食事試料)

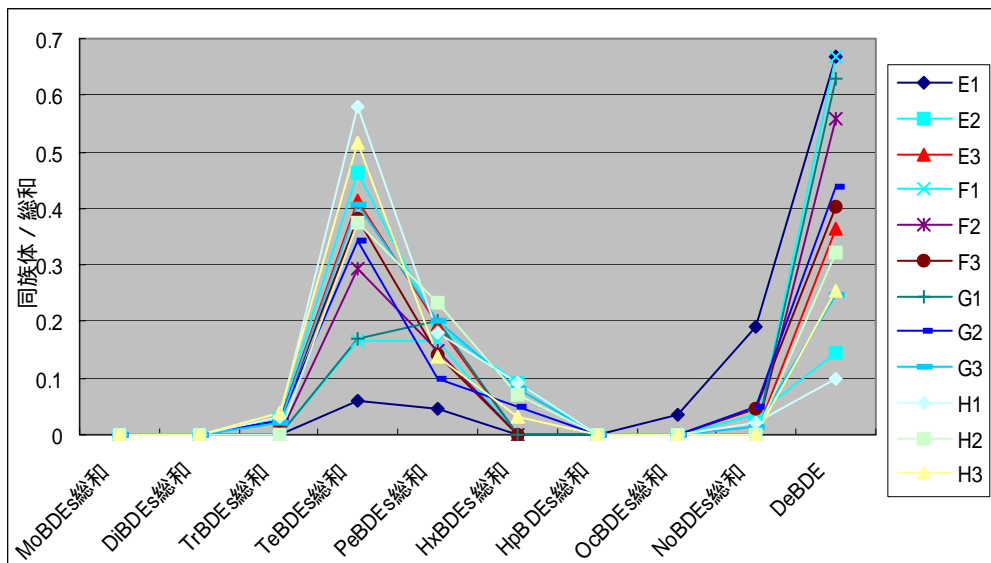


図-74 ポリ臭素化ジフェニルエーテル同族体分布(食事試料)

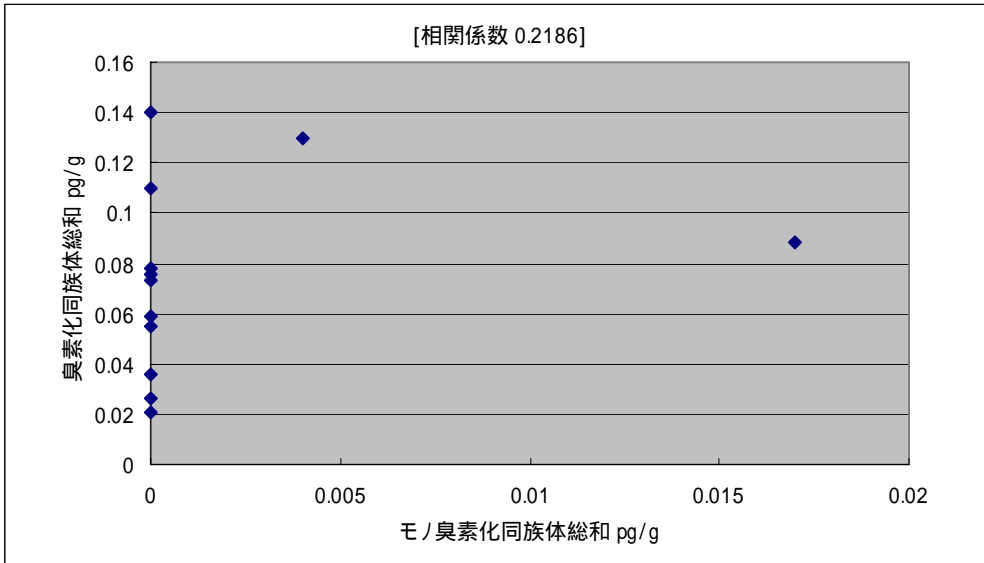


図-75 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ダイオキシン類同族体総和の相関(食事試料)

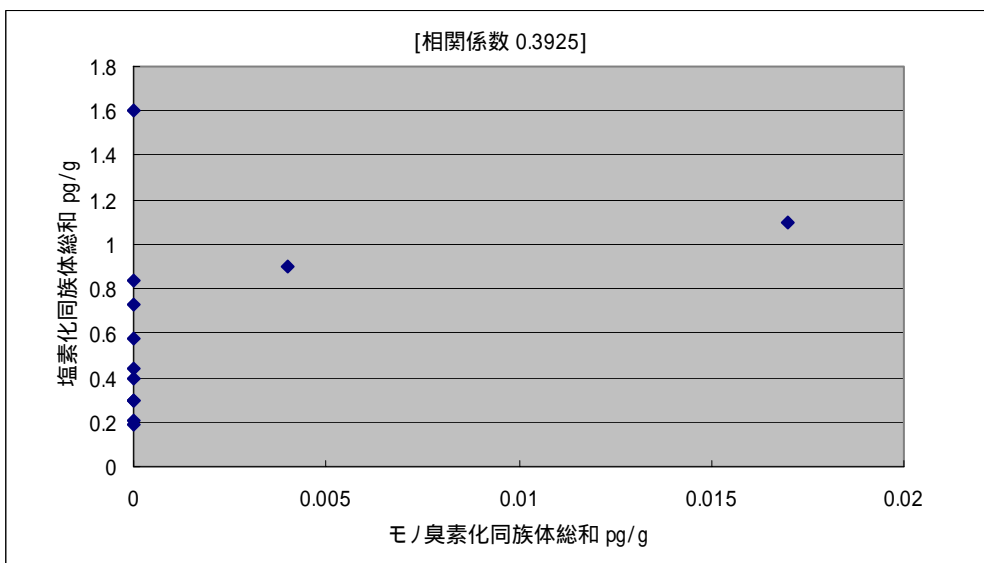


図-76 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
(塩素化)ダイオキシン類同族体総和の相関(食事試料)

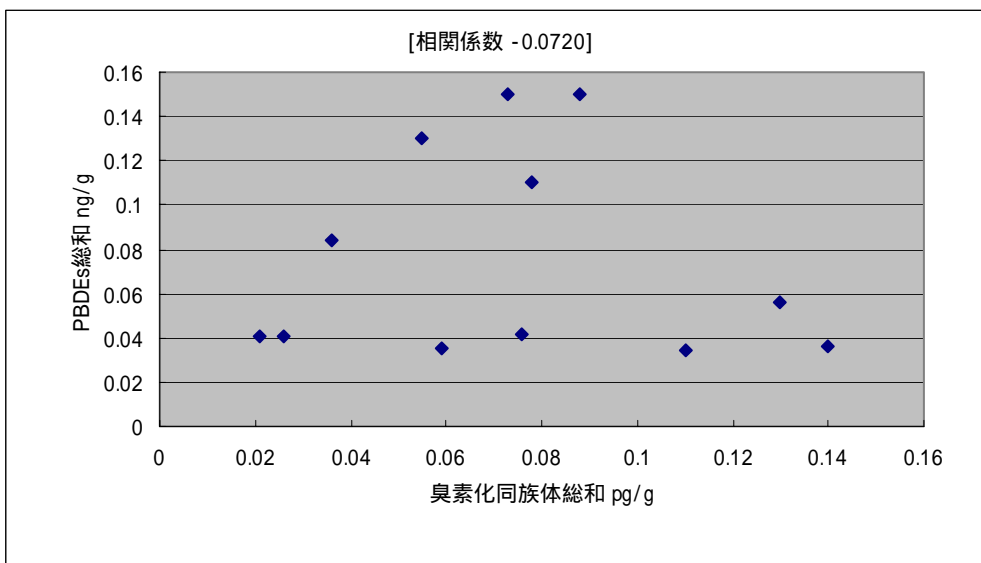


図-77 ポリ臭素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(食事試料)

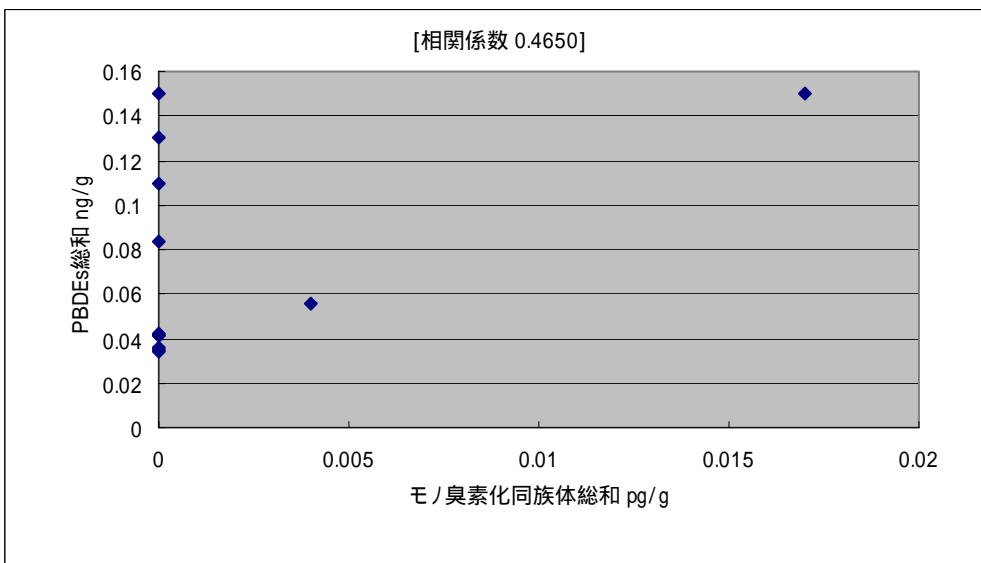


図-78 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(食事試料)

(10) ハウスダスト

ハウスダスト中の臭素系ダイオキシン類の測定結果を表-114～117に、ポリ臭素化ジフェニルエーテルの測定結果を表-118及び119に示した。

表-114 臭素系(全臭素)ダイオキシン類測定結果(ハウスダスト-1) 単位：pg/g

分析項目	E 地域		F 地域	
	一般家庭	事業所	一般家庭	事業所
2,3,7,8-TeBDD	N.D.	N.D.	20	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	N.D.	23	20	N.D.
1,2,3,7,8-PeBDF	N.D.	N.D.	N.D.	N.D.
2,3,4,7,8-PeBDF	N.D.	50	N.D.	N.D.
1,2,3,4,7,8-HxBDF	N.D.	460	200	160
1,2,3,4,6,7,8-HpBDF	400	13000	6200	3700
OBDF	N.D.	5900	N.D.	N.D.
TeBDDs総和	50	300	4600	220
PeBDDs総和	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	N.D.	N.D.	N.D.	N.D.
HpBDDs総和	N.D.	N.D.	N.D.	N.D.
OBDD	N.D.	N.D.	N.D.	N.D.
TeBDFs総和	40	2000	1400	310
PeBDFs総和	70	3300	1400	660
HxBDFs総和	100	7000	2400	1900
HpBDFs総和	400	13000	6200	3700
OBDF	N.D.	5900	N.D.	N.D.
(PBDDs+PBDFs)総和	660	32000	16000	6800

実測濃度が検出下限未満の場合は"N.D."で表示

表-115 臭素系(全臭素)ダイオキシン類測定結果(ハウスダスト-2) 単位: pg/g

分析項目	G 地域		H 地域	
	一般家庭	事業所	一般家庭	事業所
2,3,7,8-TeBDD	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8-PeBDD	N.D.	N.D.	N.D.	N.D.
1,2,3,4,7,8-/ 1,2,3,6,7,8-HxBDD	N.D.	N.D.	N.D.	N.D.
1,2,3,7,8,9-HxBDD	N.D.	N.D.	N.D.	N.D.
OBDD	500	N.D.	N.D.	N.D.
2,3,7,8-TeBDF	36	9	11	N.D.
1,2,3,7,8-PeBDF	90	N.D.	30	N.D.
2,3,4,7,8-PeBDF	200	N.D.	30	30
1,2,3,4,7,8-HxBDF	1600	140	N.D.	170
1,2,3,4,6,7,8-HpBDF	42000	3100	3000	4200
OBDF	2700	N.D.	N.D.	N.D.
TeBDDs総和	27	330	24	390
PeBDDs総和	N.D.	N.D.	N.D.	N.D.
HxBDDs総和	360	N.D.	N.D.	N.D.
HpBDDs総和	1500	N.D.	N.D.	N.D.
OBDD	500	N.D.	N.D.	N.D.
TeBDFs総和	2700	1200	660	360
PeBDFs総和	6800	1300	1900	980
HxBDFs総和	19000	2200	2400	2400
HpBDFs総和	42000	3100	3000	4200
OBDF	2700	N.D.	N.D.	N.D.
(PBDDs+PBDFs)総和	76000	8100	8000	8300

実測濃度が検出下限未満の場合は"N.D."で表示

表-116 臭素系(モノ臭素)ダイオキシン類測定結果(ハウスダスト-1) 単位: pg/g

分析項目	E 地域		F 地域	
	一般家庭	事業所	一般家庭	事業所
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	N.D.	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	N.D.	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	N.D.	N.D.	N.D.	N.D.

実測濃度が検出下限未満の場合は"N.D."で表示

表-117 臭素系(モノ臭素)ダイオキシン類測定結果(ハウスダスト-2) 単位: pg/g

分析項目	G 地域		H 地域	
	一般家庭	事業所	一般家庭	事業所
2-MoB-3,7,8-TrCDD	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDD	N.D.	N.D.	N.D.	N.D.
2-MoB-3,6,7,8,9-PeCDD	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,6,7,8,9-HxCDD	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,4,6,7,8,9-HpCDD	N.D.	N.D.	N.D.	N.D.
3-MoB-2,7,8-TrCDF	N.D.	N.D.	N.D.	N.D.
1-MoB-2,3,7,8-TeCDF	N.D.	N.D.	N.D.	N.D.
MoB-TrCDDs総和	N.D.	N.D.	N.D.	N.D.
MoB-TeCDDs総和	N.D.	N.D.	N.D.	N.D.
MoB-PeCDDs総和	10	N.D.	N.D.	N.D.
MoB-HxCDDs総和	N.D.	N.D.	N.D.	N.D.
MoB-HpCDDs総和	N.D.	N.D.	N.D.	N.D.
MoB-TrCDFs総和	N.D.	N.D.	N.D.	N.D.
MoB-TeCDFs総和	N.D.	N.D.	N.D.	N.D.
MoB-PeCDFs総和	N.D.	N.D.	N.D.	N.D.
MoB-HxCDFs総和	N.D.	N.D.	30	N.D.
MoB-HpCDFs総和	N.D.	N.D.	N.D.	N.D.
(MoBPCDDs+MoBPCDFs)総和	10	N.D.	30	N.D.

実測濃度が検出下限未満の場合は"N.D."で表示

表-118 ポリ臭素化ジフェニルエーテル測定結果(ハウスダスト-1)

単位 : ng/g

分析項目	E 地域		F 地域	
	一般家庭	事業所	一般家庭	事業所
4-MoBDE (#3)	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE (#7)	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE (#15)	3	N.D.	N.D.	N.D.
2,2',4-TrBDE (#17)	8	N.D.	N.D.	N.D.
2,4,4'-TrBDE (#28)	36	N.D.	8	3
2,3',4',6-TeBDE (#71)	84	1.5	8	5
2,2',4,5'-TeBDE (#49)	6	N.D.	N.D.	N.D.
2,2',4,4'-TeBDE (#47)	260	6.0	33	34
2,3',4,4'-TeBDE (#66)	180	1.2	11	5
3,3',4,4'-TeBDE (#77)	14	N.D.	N.D.	N.D.
2,2',4,4',6-PeBDE (#100)	14	1.2	6	N.D.
2,3',4,4',6-PeBDE (#119)	58	N.D.	N.D.	N.D.
2,2',4,4',5-PeBDE (#99)	420	7.4	41	24
2,2',3,4,4'-PeBDE (#85)	30	N.D.	N.D.	N.D.
3,3',4,4',5-PeBDE (#126)	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE (#154)	17	N.D.	N.D.	N.D.
2,2',4,4',5,5'-HxBDE (#153)	170	4	N.D.	4
2,2',3,4,4',5'-HxBDE (#138)	9	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE (#156)	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HpBDE (#184)	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6'-HpBDE (#183)	6	7	N.D.	15
2,3,3',4,4',5',6'-HpBDE (#191)	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcbDE (#197)	N.D.	6	N.D.	8
2,2',3,4,4',5,5',6-OcbDE (#203)	N.D.	9	N.D.	5
2,2',3,3',4,4',5,6'-OcbDE (#196)	4	9	N.D.	7
2,3,3',4,4',5,5',6-OcbDE (#205)	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE (#207)	33	90	15	25
2,2',3,3',4,4',5,5',6-NoBDE (#206)	62	130	17	32
DeBDE (#209)	950	2000	170	450
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	3	N.D.	N.D.	N.D.
TrBDEs 総和	44	N.D.	8	3
TeBDEs 総和	590	8.7	52	44
PeBDEs 総和	620	13	56	24
HxBDEs 総和	200	4	N.D.	4
HpBDEs 総和	6	7	N.D.	15
OcbDEs 総和	4	33	N.D.	23
NoBDEs 総和	120	290	42	74
DeBDE	950	2000	170	450
PBDEs 総和	2500	2400	330	640

実測濃度が検出下限未満の場合は"N.D."で表示

表-119 ポリ臭素化ジフェニルエーテル測定結果(ハウスダスト-2)

単位 : ng/g

分析項目	G 地域		H 地域	
	一般家庭	事業所	一般家庭	事業所
4-MoBDE (#3)	N.D.	N.D.	N.D.	N.D.
2,4-DiBDE (#7)	N.D.	N.D.	N.D.	N.D.
4,4'-DiBDE (#15)	N.D.	N.D.	2	N.D.
2,2',4-TrBDE (#17)	N.D.	0.4	8	0.5
2,4,4'-TrBDE (#28)	2.3	1.2	36	N.D.
2,3',4',6-TeBDE (#71)	3.3	1.8	35	N.D.
2,2',4,5'-TeBDE (#49)	N.D.	0.3	2	N.D.
2,2',4,4'-TeBDE (#47)	7.5	7.8	170	3.2
2,3',4,4'-TeBDE (#66)	3.3	1.8	36	N.D.
3,3',4,4'-TeBDE (#77)	N.D.	N.D.	2	N.D.
2,2',4,4',6-PeBDE (#100)	N.D.	1.1	4	0.5
2,3',4,4',6-PeBDE (#119)	N.D.	N.D.	2	N.D.
2,2',4,4',5-PeBDE (#99)	3.5	7.6	64	3.0
2,2',3,4,4'-PeBDE (#85)	N.D.	N.D.	3	N.D.
3,3',4,4',5-PeBDE (#126)	N.D.	N.D.	N.D.	N.D.
2,2',4,4',5,6'-HxBDE (#154)	N.D.	1.1	3	N.D.
2,2',4,4',5,5'-HxBDE (#153)	N.D.	3.3	10	1.3
2,2',3,4,4',5'-HxBDE (#138)	N.D.	N.D.	N.D.	N.D.
2,3,3',4,4',5'-HxBDE (#156)	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',6,6'-HxBDE (#184)	N.D.	N.D.	N.D.	N.D.
2,2',3,4,4',5',6'-HxBDE (#183)	7	10	6	2.8
2,3,3',4,4',5',6'-HxBDE (#191)	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',6,6'-OcbBDE (#197)	25	4.8	5	3.5
2,2',3,4,4',5,5',6-OcbBDE (#203)	46	2.9	6	8.8
2,2',3,3',4,4',5,6'-OcbBDE (#196)	45	3.5	7	7.3
2,3,3',4,4',5,5',6-OcbBDE (#205)	N.D.	N.D.	N.D.	N.D.
2,2',3,3',4,4',5,6,6'-NoBDE (#207)	290	18	20	33
2,2',3,3',4,4',5,5',6-NoBDE (#206)	530	20	23	43
DeBDE (#209)	6600	470	220	520
MoBDEs 総和	N.D.	N.D.	N.D.	N.D.
DiBDEs 総和	N.D.	N.D.	2	N.D.
TrBDEs 総和	2.3	1.6	44	0.5
TeBDEs 総和	14	12	260	3.2
PeBDEs 総和	3.5	11	90	3.5
HxBDEs 総和	N.D.	4.4	13	1.3
HpBDEs 総和	7.0	10	6	2.8
OcbBDEs 総和	180	15	28	28
NoBDEs 総和	1100	53	61	110
DeBDE	6600	470	220	520
PBDEs 総和	7900	580	720	670

実測濃度が検出下限未満の場合は"N.D."で表示

まとめ及び考察

ポリ臭素化ダイオキシン類は、同族体の総和で660～76,000 pg/g(平均値19,000 pg/g)の範囲で検出され、G地域一般家庭が最も高い濃度を示した。同族体組成は、TeBDFs、PeBDFs、HxBDFs及びHpBDFsが主要成分であり、一部TeBDDsの割合が高かった(図-79)。G地域一般家庭では、HxBDDs、HpBDDs及びOBDDも検出された。2,3,7,8-異性体では、2,3,7,8-TeBDD、OBDD、2,3,7,8-TeBDF、1,2,3,7,8-PeBDF、2,3,4,7,8-PeBDF、1,2,3,4,7,8-HxBDF、1,2,3,4,6,7,8-HpBDF及びOBDFが検出された。モノ臭素ポリ塩素化ダイオキシン類同族体総和とポリ臭素化ダイオキシン類同族体総和の相関係数は0.1195であった(図-82)。

モノ臭素ポリ塩素化ダイオキシン類は、G地域一般家庭においてMoB-PeCDDs、H地域一般家庭においてMoB-HxCDFsが検出された(図-80)。2,3,7,8-異性体で検出されたものはなかった。

ポリ臭素化ジフェニルエーテルは、同族体の総和で330～7,900 ng/g(平均値2,000 ng/g)の範囲で検出され、G地域一般家庭が最も高い濃度を示した。同族体組成は、DeBDEが主成分であり、E、F及びH地域の一般家庭ではTeBDEs及びPeBDEsの割合が高い傾向であった(図-81)。ポリ臭素化ダイオキシン類同族体総和及びモノ臭素ポリ塩素化ダイオキシン類同族体総和との相関係数はそれぞれ0.9054及び0.1151であった(図-83及び84)。

表-120 地点種類別総括表

	一般家庭	事業所	全種類
PBDD/Fs 総和 (pg/g)	25000 (660～76000)	14000 (6800～32000)	19000 (660～76000)
MoBPCDD/Fs 総和 (pg/g)	10 (N.D.～30)	0 (N.D.～N.D.)	5.0 (N.D.～30)
PBDEs 総和 (ng/g)	2900 (330～7900)	1100 (580～2400)	2000 (330～7900)

地点種ごとの平均値を示した。ただし、N.D.は0として算出した。

下段()内は検出範囲。

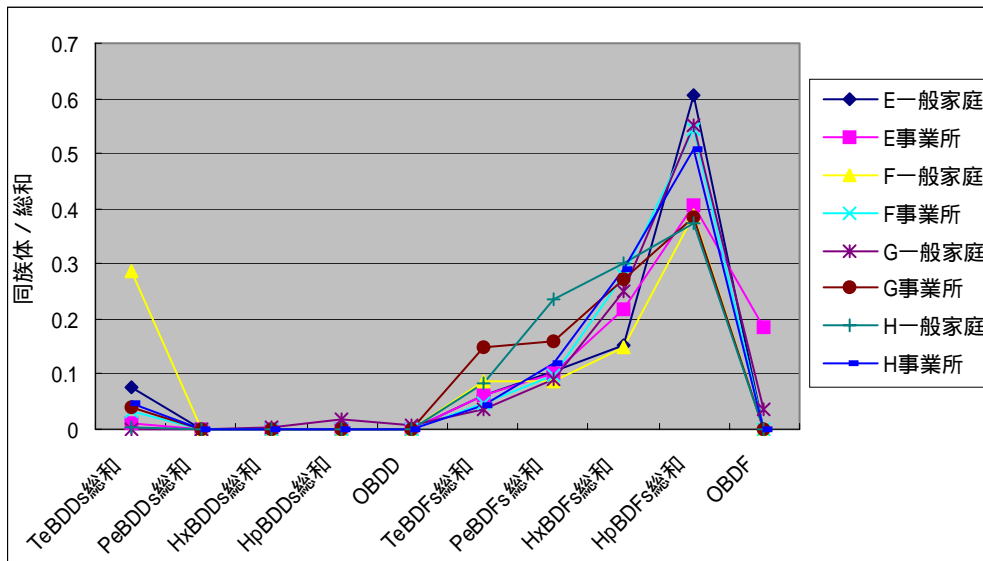


図-79 ポリ臭素化ダイオキシン類同族体分布(ハウスダスト)

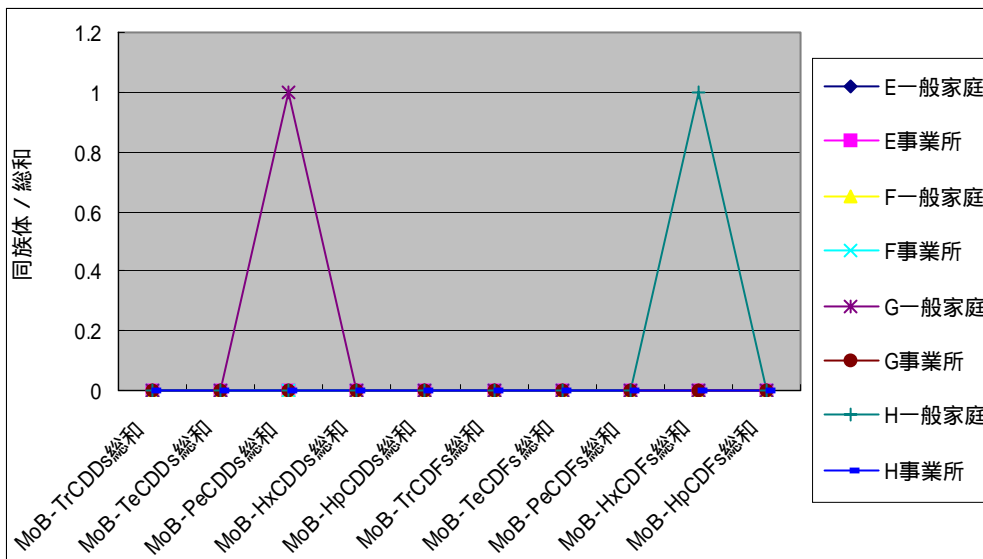


図-80 モノ臭素ポリ塩素化ダイオキシン類同族体分布(ハウスダスト)

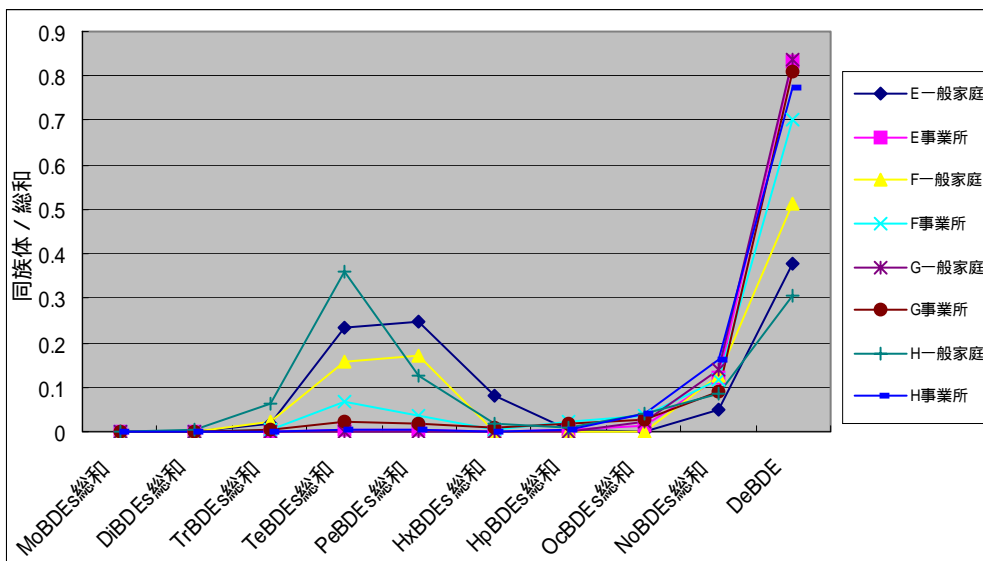


図-81 ポリ臭素化ジフェニルエーテル同族体分布(ハウスダスト)

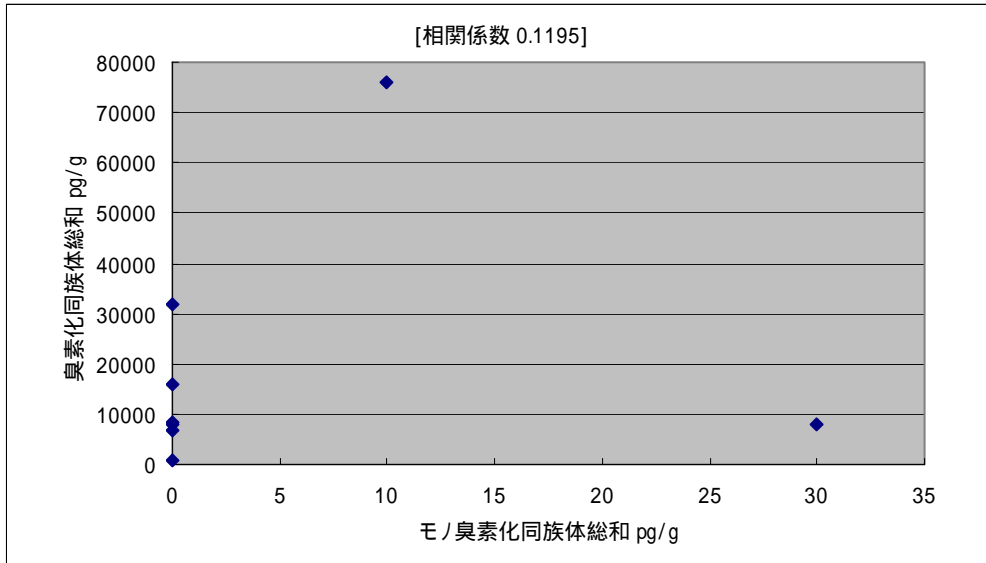


図-82 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
 ポリ臭素化ダイオキシン類同族体総和の相関(ハウスダスト)

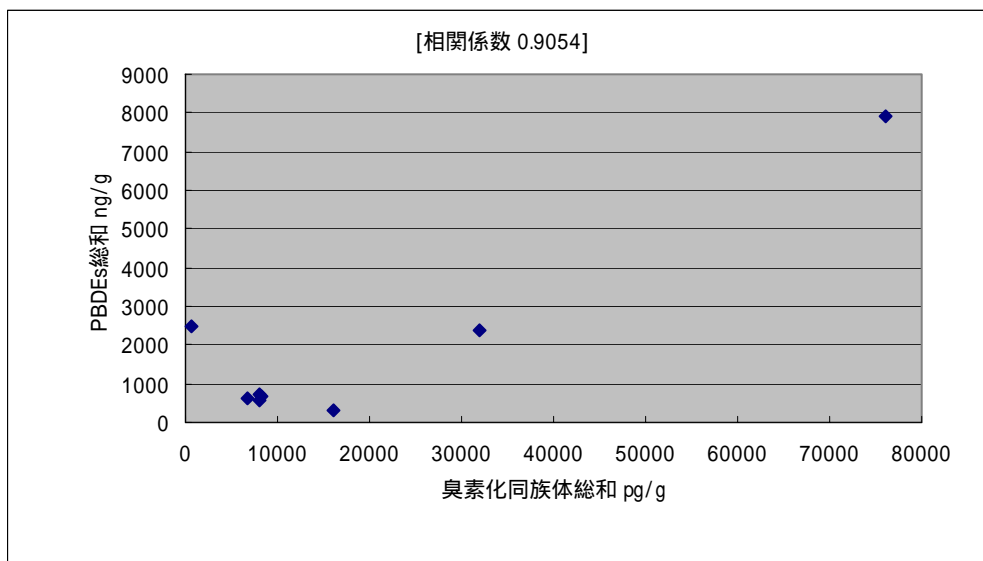


図-83 ポリ臭素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(ハウスダスト)

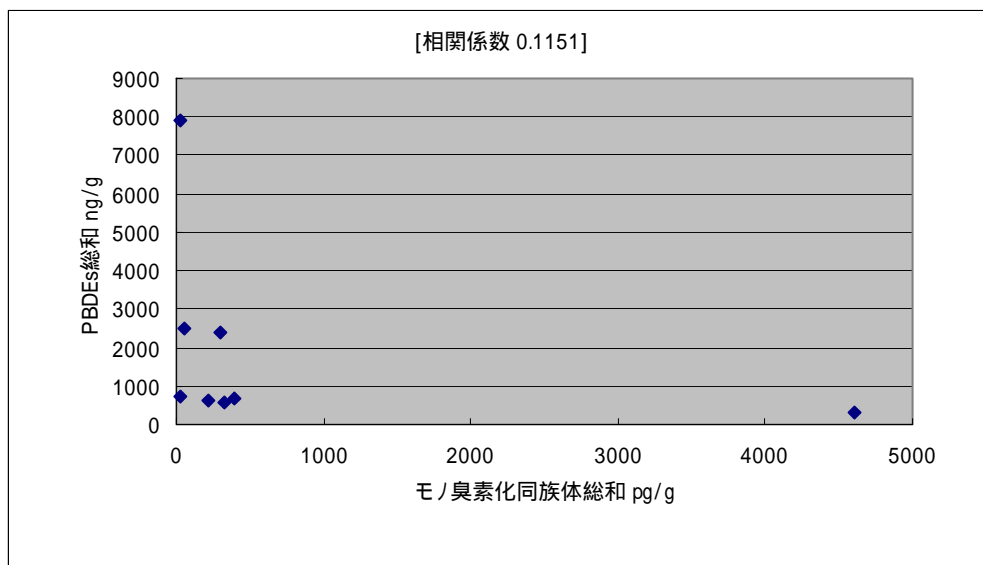


図-84 モノ臭素ポリ塩素化ダイオキシン類同族体総和と
ポリ臭素化ジフェニルエーテル同族体総和の相関(ハウスダスト)

6 まとめ

今回の調査において、大気、降下ばいじん、土壌、底質等の環境試料及び食事試料の一部から、臭素系ダイオキシン類であるモノ臭素ポリ塩素化ダイオキシン類及びポリ臭素化ダイオキシン類が検出された。しかし、これらの検出率及びレベルは、(塩素化)ダイオキシン類に比べ低いものであり、また、これまでの調査と比べても同等以下のレベルであり、今回までの調査範囲では(塩素化)ダイオキシン類に比べ、人及び生物に対する影響は比較的小さいと予想された。ただし、過去の調査で底質や野生生物の一部から高濃度のモノ臭素ポリ塩素化ダイオキシン類及びポリ臭素化ダイオキシン類が検出されていること等から、今後も環境・生物試料のモニタリングを続ける必要があると考えられた。また、今回から調査対象になった(平成14年度は予備調査)ハウスダストからも、全ての試料からポリ臭素化ダイオキシン類が検出され、高濃度に検出された試料も多く、室内環境における人に対する暴露が懸念された。今後もハウスダストについても継続して調査することが必要と考えられた。

今回の調査の測定対象は、モノ臭素ポリ塩素化ダイオキシン類の2,3,7,8-位置換体に関しては全体のごく一部であり、また、臭素系ダイオキシン類は(塩素化)ダイオキシン類との検出感度の差も大きいことから、人及び生物に対する影響について(塩素化)ダイオキシン類と完全に比較するのは今回の調査では困難である。今後、臭素系ダイオキシン類の高感度分析法やより多くの2,3,7,8-位置換体の分別定量法の開発を行うとともに、臭素系ダイオキシン類の人への健康や生態系への影響をより明確に把握するため、調査を継続する必要がある。