Supporting Information for

Does the choice of NOEC or EC10 affect the hazardous concentration for 5% of the species?

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Table S1. Summary table for zinc (the unit for concentration = µg/L)

Test species	Group	Endpoint	Duration (d)	NOEC	LOEC	Reduction percentage NOEC	Reduction percentage LOEC	EC5	EC10 (SE)	EC20	Best model[b]	Reference
Chroococcus paris	Algae	Pop. growth	10	400	1000	2.7%	17.3%	539	757 (84)	1078	W1.3	Les &Walker 1984[1]
Daphnia magna	Crustaceans	Reproduction	21	100	150	5.4%	53.1%	98.7	110 (14)	124	W1.3	Munzinger &Monicelli 1991[2]
Daphnia magna	Crustaceans	Reproduction	21	100	150	0.0%	62.6%	137	140 (153)	143	W1.3	Munzinger &Monicelli 1991[2]
Daphnia magna	Crustaceans	Reproduction	21	100	150	23.3%	54.2%	53.9	70.7 (34)	93.7	W1.3	Munzinger &Monicelli 1991[2]
Daphnia magna	Crustaceans	Reproduction	50	25	50	9.2%	23.2%	18.1	26.3 (15)	43.6	W2.3	Paulauskis & Winner 1988[3]
Daphnia magna	Crustaceans	Reproduction	50	75	100	6.7%	27.7%	72.1	79.8 (4.7)	91.6	W2.3	Paulauskis & Winner 1988[3]
Daphnia magna	Crustaceans	Reproduction	50	150	175	6.8%	13.9%	141	163 (27)	191	LL.3	Paulauskis & Winner 1988[3]
Hyalella azteca	Crustaceans	Survival	70	42	108	4.1%	39.6%	45.5	59.7 (21)	79.3	W1.3	Borgmann et al. 1993[4]
Ephoron virgo[a]	Insects	Survival	10	720	NA	NA	NA	NA	720 (NA)	NA	NA	van der Geest et al. 2001[5]
Dreissena polymorpha	Molluscans	Survival	70	382	1266	2.9%	54.5%	377	517 (109)	719	W1.2	Kraak et al. 1994[6]
Potamopyrgus jenkinsi	Molluscans	Growth	77-112	72	115	22.0%	53.2%	35.7	48.9 (2.6)	67.8	W1.2	Dorgelo et al. 1995 [7]
Danio rerio	Fish	Time to hatch	16	360	710	27.1%	28.8%	56.9	187 (NA)	617	W2.4	Dave et al. 1987[8]
Jordanella floridae	Fish	Growth	100	26	51	7.1%	11.5%	13.3	37.4 (1.5)	110	W1.3	Spehar 1976[9]
Oncorhynchus mykiss	Fish	Survival	21 mo	320	640	1.2%	5.1%	634	1005 (48)	1881	W2.2	Sinley et al. 1974[10]
Oncorhynchus mykiss	Fish	Survival	>21 mo	140	260	0.0%	5.2%	258	301 (5.8)	370	W2.3	Sinley et al. 1974[10]
Phoxinus phoxinus	Fish	Reproduction	>137	50	130	3.6%	75.8%	52.1	57.6 (12)	66.1	W2.3	Bengtsson 1974[11]
Pimephales promelas	Fish	Reproduction	240	78	145	10.9%	77.1%	71.5	77.2 (15)	85.6	W2.3	Benoit & Holcombe 1978[12]

SE = standard error

[a] EC10 estimated by the original study was used as NOEC. NA = not available.

[b] LL.3 = three-parameter log-logistic model; W1.2 and W1.3 = two- and three-parameter Weibull-1 model; W2.2, W2.3, and W2.4 = two-, three-, and four- parameter Weibull-2 model.

Table S2. Summary table for lead (the unit for concentration = μg/L)

Test species	Group	Endpoint	Duration (d)	NOEC	LOEC	Reduction percentage NOEC	Reduction percentage LOEC	EC5	EC10 (SE)	EC20	Best model[b]	Reference
Ankistrodesmus Falcatus[a]	Algae	Pop. growth	10	1018	NA	NA	NA	681	1018 (78)	1549	W1.2	Devi Prasad & Devi Pradas 1982[13]
Chlorocoecum spp[a]	Algae	Pop. growth	10	1302	NA	NA	NA	903	1302 (79)	1934	LL.2	Devi Prasad & Devi Pradas 1982[13]
Scenedesmus obliquus[a]	Algae	Pop. growth	10	1287	NA	NA	NA	913	1287 (78)	1867	LL.2	Devi Prasad & Devi Pradas 1982[13]
Ceriodaphnia dubia	Crustaceans	Reproduction	7	28.8	52.1	2.2%	7.2%	43.3	61.5 (30)	88.9	W1.3	Spehar et al. 1986[14]
Daphnia magna	Crustaceans	Reproduction	NA	210.6	729.0	6.1%	43.4%	187	281 (99)	430	W1.3	Enserink et al. 1995[15]
Hyalella azteca	Crustaceans	Survival	70	2.6	11.6	7.2%	58.3%	1.99	3.11 (3.1)	4.96	W1.3	Borgmann et al. 1993[4]
Dreissena polymorpha	Molluscans	Survival	70	85	364	7.8%	35.1%	58.2	105 (88)	198	LL.3	Kraak et al. 1994[6]
Catostomus commersonii	Fish	Survival	60	119	253	0.0%	75.8%	178	190 (557)	204	LL.3	Sauter et al. 1976[16]
Danio rerio	Fish	Survival time	NA	30	60	11.5%	17.1%	7.68	23.7 (7.1)	80.3	W1.4	Dave & Xiu 1991[17]
Esox Lucius	Fish	Survival	50	253	483	57.2%	85.7%	109	124 (57)	149	W2.3	Sauter et al. 1976[16]
Ictalurus punctatus	Fish	Survival	60	75	136	2.3%	84.3%	82.0	89.0 (27)	97.2	LL.3	Sauter et al. 1976[16]
Lepomis macrochirus	Fish	Survival	60	70	120	39.0%	81.5%	46.5	51.0 (9.4)	57.9	W2.3	Sauter et al. 1976[16]
Oncorhynchus mykiss	Fish	Deformity	570	18.2	32.6	0.5%	69.8%	20.5	21.6 (0.4)	23.3	W2.2	Davies et al. 1976[18]
Oncorhynchus mykiss	Fish	Deformity	570	4.1	7.6	0.3%	4.8%	7.67	8.99 (0.04)	10.7	LL.2	Davies et al. 1976[18]
Oncorhynchus mykiss	Fish	Deformity	570	7.2	14.6	0.9%	40.9%	8.73	9.76 (0.4)	11.4	W2.2	Davies et al. 1976[18]
Oncorhynchus mykiss	Fish	Survival	60	71	146	1.7%	49.3%	87.8	101 (21)	117	W1.3	Sauter et al. 1976[16]
Salvelinus fontinalis	Fish	Deformity	455	39.44	84.49	0.0%	34.0%	67.3	72.5 (0.6)	78.6	LL.2	Holcombe et al. 1976[19]
Salvelinus namaycush	Fish	Survival	60	48	83	2.6%	8.5%	64.9	89.3 (25)	125	W1.3	Sauter et al. 1976[16]
Sander vitreus	Fish	Survival	30	237	397	51.7%	74.0%	25.8	47.1 (147)	88.2	W1.3	Sauter et al. 1976[16]

SE = standard error

[a] NOEC and LOEC were not indicated in the reference and EC10 was used as NOEC. NA = not available.

[b] LL.3 = three-parameter log-logistic model; W1.2 and W1.3 = two- and three-parameter Weibull-1 model; W2.2, W2.3, and W2.4 = two-, three-, and four- parameter Weibull-2 model.

Table S3. Summary table for nonylphenol (the unit for concentration = μg/L)

Test species	Group	Endpoint	Duration (d)	NOEC	LOEC	Reduction percentage		EC5	EC10 (SE)	EC20	Best model[a]	Reference
						NOEC	LOEC					
Pseudokirchneriella subcapitata	Algae	Biomass	4	694	1480	11.4%	69.8%	549	668 (107)	826	LL.3	Brooke 1993[20]
Ceriodaphnia dubia	Crustaceans	Reproduction	7	125	250	0.4%	13.4%	206	236 (10)	272	W1.3	Tatarazako et al. 2002[21]
Daphnia magna	Crustaceans	Reproduction	21	116	215	0.0%	48.7%	180	186 (305)	195	W2.3	Brooke 1993[20]
Daphnia magna	Crustaceans	Reproduction	21	24	39	1.8%	4.2%	42.9	63.6 (52)	94.7	W1.4	Comber et al. 1993[22]
Chironomus tentans	Insects	Survival	20	42	91	0.0%	49.3%	73.0	77.2 (79)	82.1	LL.3	Kahl et al. 1997[23]
Danio rerio	Fish	Survival	NA	30	100	12.3%	39.4%	17.6	26.0 (11)	44.3	W2.3	Hill & Janz 2003[24]
Oncorhynchus mykiss	Fish	Growth	90	6	10.3	2.0%	32.1%	6.75	7.57 (0.3)	8.85	W2.3	Brooke 1993[20]
Oryzias latipes	Fish	Survival	40	8.2	17.7	5.8%	14.1%	7.39	12.7 (4.3)	26.6	W2.3	Yokota et al. 2001[25]
Pimephales promelas	Fish	Survival	33	7.4	14	10.6%	23.6%	4.88	7.13 (1.2)	12.0	W2.3	Ward & Boeri 1991[26]

NA = not available, SE = standard error.

[a] LL.3 = three-parameter log-logistic model; W1.2 and W1.3 = two- and three-parameter Weibull-1 model; W2.2, W2.3, and W2.4 = two-, three-, and four- parameter Weibull-2 model.

Table S4. Summary table for 3,4-dichlorobenzenamine (the unit for concentration = μg/L)

Test species	Group	Endpoint	Duration (d)	NOEC	LOEC	Reduction Percentage NOEC	Reduction Percentage LOEC	EC5	EC10 (SE)	EC20	Best model[a]	Reference
Brachionus calyciflorus	Crustaceans	Pop. growth	4	2500	5000	12.0%	75.0%	2052	2474 (185)	3031	W1.4	Janssen et al. 1994[27]
Brachionus calyciflorus	Crustaceans	Pop. growth	3	5000	10000	0.0%	90.1%	6094	6335 (4436)	6678	W2.3	Janssen et al. 1994[27]
Ceriodaphnia quadrangula	Crustaceans	Pop. growth	21	2.97	6.15	13.5%	70.8%	2.08	2.66 (0.7)	3.44	W1.3	Kluttgen et al . 1996[28]
Daphnia magna	Crustaceans	Pop. growth	42	10	25	5.4%	18.9%	18.2	30.7 (7.2)	54.1	LL.4	Kluttgen et al . 1996[28]
Daphnia magna	Crustaceans	Reproduction	21	10	20	2.8%	93.5%	10.3	10.8 (1.5)	11.5	W2.3	Crossland & Hillaby 1985[29]
Daphnia magna	Crustaceans	Reproduction	21	5	10	5.3%	23.2%	4.89	6.64 (0.5)	9.25	LL.3	Guilhermino et al 1994[30]
Daphnia magna	Crustaceans	Reproduction	21	6	12	5.7%	18.7%	5.85	8.72 (0.2)	13.2	W1.4	Elendt 1990[31]
Daphnia magna	Crustaceans	Survival	14	2.5	5	9.6%	23.0%	1.53	2.58 (0.8)	4.46	W1.3	Diamantino et al. 1997[32]
Daphnia magna	Crustaceans	Reproduction	21	5	10	7.3%	26.3%	5.32	7.52 (0.6)	12.0	W2.4	Baird 1991[33]
Gammarus pulex	Crustaceans	Growth	25	80	240	1.7%	28.9%	107	136 (32)	189	W2.3	Taylor et al. 1994[34]
Chironomus riparius	Insects	Growth	12	760	2160	11.1%	37.2%	405	699 (759)	1236	W1.3	Taylor et al. 1994[34]
Chironomus riparius	Insects	Growth	10	170	970	0.2%	9.6%	626	998 (38)	1885	W2.3	Taylor et al. 1991[35]
Brachydanio rerio	Fish	Survival	180	20	100	0.1%	30.8%	58.4	71.1 (14)	87.2	W1.3	Nagel et al. 1991[36]
Oncorhynchus mykiss	Fish	Growth	28	19	39	1.0%	2.9%	13.4	20.8 (12)	33.0	W1.4	Crossland 1985[37]
Perca fluviatilis	Fish	Survival	18	20	200	0.0%	36.4%	107	130 (350)	161	LL.3	Schafers & Nagel 1993[38]
Pimephales promelas	Fish	Growth	28	5.1	7.1	1.1%	2.7%	9.49	14.2 (5.2)	24.4	W2.3	Call 1987[39]

SE = standard error.

[a] LL.3 = three-parameter log-logistic model; W1.2 and W1.3 = two- and three-parameter Weibull-1 model; W2.2, W2.3, and W2.4 = two-, three-, and four- parameter Weibull-2 model.

Table S5. Summary table for lindane (the unit for concentration = μg/L)

Test species	Group	Endpoint	Duration (d)	NOEC	LOEC	Reduction percentage		EC5	EC10 (SE)	EC20	Best model[b]	Reference
						NOEC	LOEC					
Brachionus calyciflorus	Crustaceans	Pop. growth	3	2500	5000	12.9%	31.4%	1258	2069 (218)	3476	W2.3	Janssen et al. 1994[27]
Brachionus calyciflorus	Crustaceans	Pop. growth	NA	10000	15000	3.4%	54.6%	10285	10943 (781)	11908	W2.3	Ferrando et al. 1993[40]
Daphnia magna[a]	Crustaceans	Growth	16	150	NA	NA	NA	NA	330 (NA)	NA	NA	Deneer et al. 1988[41]
Daphnia magna	Crustaceans	Survival	21	160	250	24.9%	49.4%	66.0	95.6 (19)	140.7	W1.2	Ferrando et al. 1995[42]
Gammarus fasciatus	Crustaceans	Survival	120	4.3	8.6	67.6%	85.4%	0.909	1.11 (0.5)	1.46	W2.3	Macek et al. 1976[43]
Gammarus pulex	Crustaceans	Growth	14	2.67	6.11	7.0%	15.5%	2.03	3.73 (1.1)	8.57	W2.3	Blockwell et al. 1996[44]
Chironomus riparius	Insects	Growth	10	0.09	0.20	3.5%	6.8%	0.138	0.316 (0.06)	0.746	W1.3	Taylor et al. 1991[35]
Chironomus riparius	Insects	Emergence	NA	1.1	9.9	4.6%	89.1%	1.12	1.34 (0.03)	1.70	W2.3	Taylor et al. 1993[45]
Chironomus tentas	Insects	Emergence	NA	5	7.3	36.6%	99.8%	4.69	4.76 (1.0)	4.86	W2.3	Macek et al. 1976[43]
Brachydanio rerio	Fish	Growth	35	40	80	0.7%	3.2%	96.8	132 (17)	183	W1.3	Gorge & Nagel 1990[46]
Brachydanio rerio	Fish	Survival	14	40	80	8.3%	18.4%	26.3	47.0 (23)	86.3	W1.3	Ensenbach & Nagel 1995[47]
Pimephales promelas	Fish	Survival	301	9.1	23.5	1.5%	22.5%	13.8	17.5 (4.2)	22.5	W1.3	Macek et al. 1976[43]
Salvelinus fontinalis	Fish	Growth	261	8.8	16.6	23.6%	28.5%	0.080	0.619 (0.9)	5.20	W1.3	Macek et al. 1976[43]

SE = standard error.

[a] EC10 was directly obtained from the reference. NA = not available.

[b] LL.3 = three-parameter log-logistic model; W1.2 and W1.3 = two- and three-parameter Weibull-1 model; W2.2, W2.3, and W2.4 = two-, three-, and four- parameter Weibull-2 model.

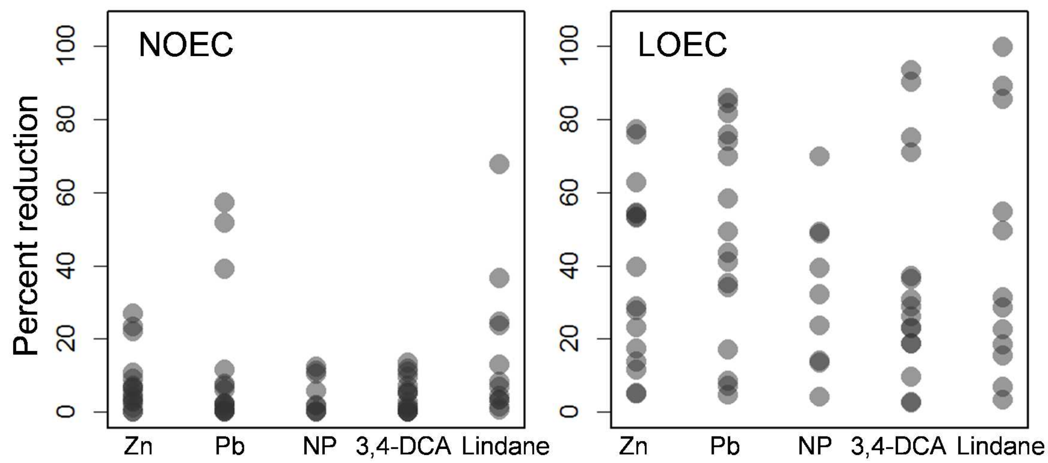

Figure S1. Percent reduction of endpoint response estimated at the no observed effect concentration (NOEC) and the lowest observed effect concentration (LOEC) for the five chemicals evaluated in this study. A Kruskal-Wallis test was performed to determine if median percent-reductions estimated at NOECs (or LOECs) were different among the five chemicals. Because results were insignificant ($p = 0.31$ and 0.72, respectively), we pooled all the data (i.e., percent reductions) for NOECs as well as LOECs (i.e., treated as a single population of values) and used for the further analyses (see the text).

NP = Nonylphenol. 3,4-DCA = 3,4-dichlorobenzenamine.

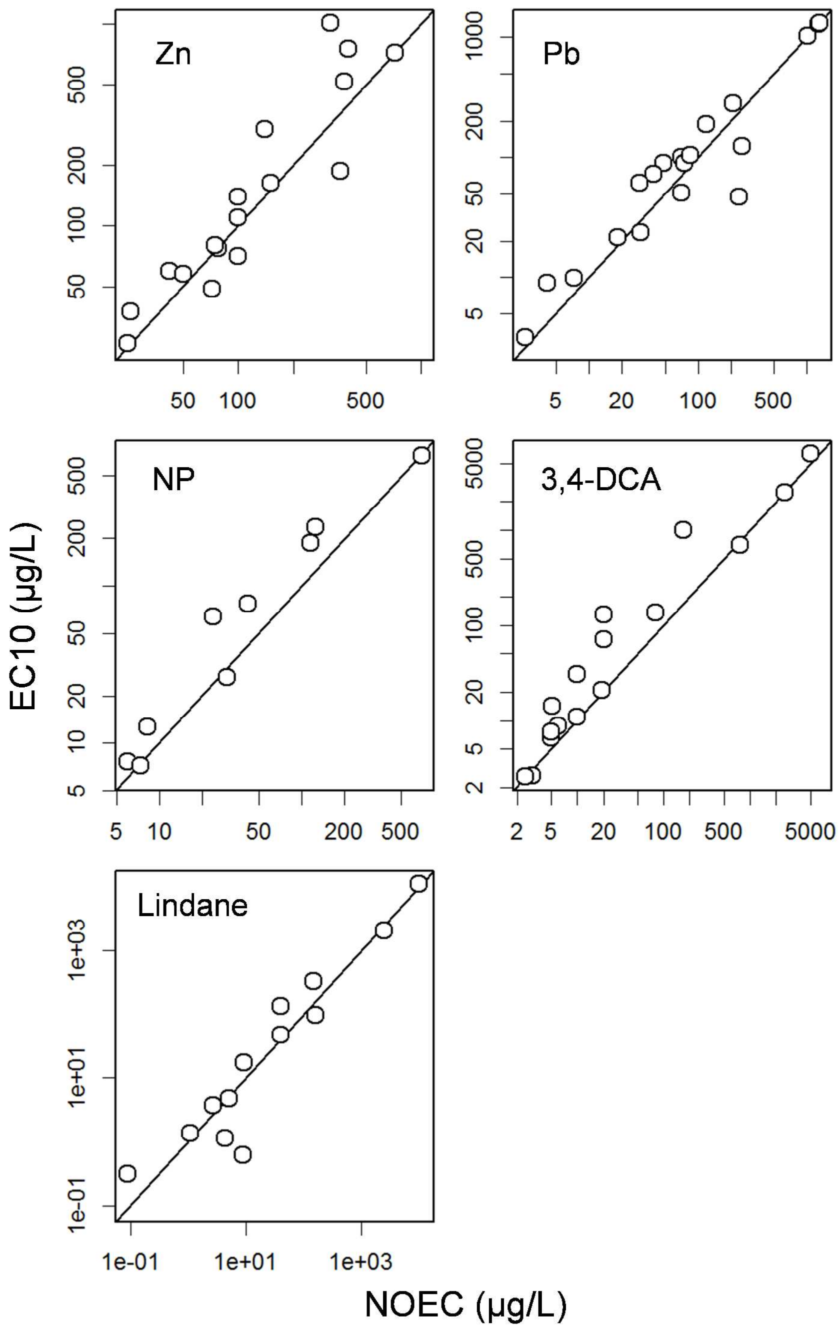

Figure S2. Relationships between the no observed effect concentration (NOEC) and the 10% effect concentration (EC10) for the five chemicals evaluated in this study.
NP = Nonylphenol. 3,4-DCA = 3,4-dichlorobenzenamine.

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