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Annex to RIVM report 711701 020

Ecotoxicological Serious Risk Concentrations for soil, sediment and (ground)water: updated proposals for first series of compounds

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This investigation has been performed for the account of the Directorate-General for Environmental Protection, Ministry of Housing, Spatial Planning and the Environment, within the framework of project 711701, Risk in relation to soil quality.

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Abstract

This annex is supplementary to RIVM report 711701 020, 'Ecotoxicological Serious Risk Concentrations for soil, sediment and (ground)water: updated proposals for first series of compounds' (E.M.J. Verbruggen, R. Posthumus and A.P. van Wezel). For the compounds considered in this report, which were not yet evaluated in the context of the project 'Setting Integrated Environmental Quality Standards', new toxicity data have been searched for. Further, additional toxicity data were collected for chlorophenols.
These toxicity data are incorporated in this annex. The data are single species toxicity data for terrestrial and aquatic organisms and effect data on terrestrial processes. All toxicity data on aquatic and terrestrial organisms refer to effects that may affect the species at the population level.

Contents

Legend

A legend of the terms used in the tables is given below.

Aqueous toxicity test

organisms	Species used in the test, if available followed by: age, size,weight or life stage
A	Y test substance analysed in test solution N test substance not analysed in solution -: no information available
test type	S: static; R: renewal; F: flow-through
test substance purity	percentage active ingredient; ag: analytical grade; rg: reagent grade; tech.: technical grade; high: high but unknown purity
pH	pH of test water; -: no information available
hardness/salinity	hardness/salinity of test water, expressed in mg calcium carbonate per liter; -: no information available
test water	am: artificial medium; tap: tap water; nw: natural water; rw: reconstituted water
exp. time	Exposure time: h: hour(s); d: day(s); w: week(s); m: month(s); min: minute(s)
criterion	toxicological endpoint, e.g. NOEC, LC50 or EC50
notes	α: given value based on measured concentrations
value	> and ≥ value indicated is highest concentration used in the test. < and ≤ value indicated is lowest concentration used in the test.

Terrestrial species or microbial processes and enzymatic activity

species/process	Species/Process used in the test, if available followed by: age, size, weight or life stage; Species are categorized in taxonomic groups
A	Y test substance analysed in test solution N test substance not analysed in solution -: no information available
soil type	Type of soil used in test, e.g. artificial soil (art. soil).
% o.m.	percentage organic matter of test soil (if presented in % organic carbon a factor of 1.7 was used to calculate % o.m.)
% clay	percentage clay of test soil
temp.	temperature at which test was performed
exp. time	Exposure time: h: hour(s); d: day(s); w: week(s); m: month(s); min: minute(s)
criterion	toxicological endpoint, e.g. NOEC, LC50 or EC50
notes	α: given value based on measured concentrations
result test soil	results as given in the original studies; > and ≥ value indicated is highest concentration used in the test. < and ≤ value indicated is lowest concentration used in the test.
stand. soil	results from test soil recalculated to standard soil (10 % o.m. and 25% clay).

Appendix I Toxicity data on cyanides

In this appendix toxicity data on free cyanide, thiocyanate and complex cyanides are presented.

Content

Table I. 1: Acute toxicity of free cyanide to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
HYDROGEN CYANIDE											
algae											
Chlamydomonas reinhardtii	Y	S	ag	6.5-7.5	-	am	72 h	EC50	0.33	c	Brack & Rottler, 1994
crustacea											
Acartia clausi	-	-	-	-	-	-	96 h	LC50	0.030		Eisler, 1991 (review)
Daphnia magna	-	-	-	-	-	-	96 h	LC50	0.16		Eisler, 1991 (review)
Daphnia pulex	-	-	-	-	-	-	96 h	LC50	0.083		Eisler, 1991 (review)
mollusca											
Physa heterostropha	-	-	-	-	-	-	96 h	LC50	0.432		Eisler, 1991 (review)
pisces											
Lepomis macrochirus, swimm-up fry	Y	F	-	7.83	220	nw	96 h	LC50	0.23-0.37	h	Smith et al., 1978
Lepomis macrochirus, juveniles	Y	F	-	7.91	220	nw	96 h	LC50	0.075-0.125	i	Smith et al., 1978
Oncorhynchus mykiss	Y	F	-	7.34	127	tap	96 h	LC50	0.043-0.058	a	McGeachy & Leduc, 1988
Oncorhynchus mykiss	Y	F	-	7.34	127	tap	96 h	LC50	0.042-0.076	b	McGeachy & Leduc, 1988
Oncorhynchus mykiss	Y	F	-	7.9	127.7	tap	18 d	EC50	0.03	p	Ruby et al., 1979
Oncorhynchus mykiss	Y	F	-	8.06	-	tap	96 h	LC50	0.028	q	Kovacs & Leduc, 1982
Oncorhynchus mykiss	Y	F	-	8.1	-	tap	96 h	LC50	0.042	r	Kovacs & Leduc, 1982
Oncorhynchus mykiss	Y	F	-	7.82	-	tap	96 h	LC50	0.068	s	Kovacs & Leduc, 1982
Oncorhynchus mykiss, 3-12 g	Y	F	-	7.9	127.7	tap	18 d	EC50	0.021	w	Dixon & Leduc, 1981
Perca flavescens, eggs	Y	F	-	7.66	220	nw	96 h	LC50	0.288		Smith et al., 1978
Perca flavescens, swimm-up fry	Y	F	-	7.71	220	nw	96 h	LC50	0.30		Smith et al., 1978
Perca flavescens, juveniles	Y	F	-	7.76	220	nw	96 h	LC50	0.076-0.108	j	Smith et al., 1978
Pimephales promelas, eggs	Y	F	-	7.86	220	nw	96 h	LC50	0.12-0.35	e	Smith et al., 1978
Pimephales promelas, swimm-up fry	Y	F	-	7.93	220	nw	96 h	LC50	0.082-0.12	f	Smith et al., 1978
Pimephales promelas, juveniles	Y	F	-	7.84	220	nw	96 h	LC50	0.082-0.137	g	Smith et al., 1978
Salmo salar	-	-	-	-	-	-	96 h	LC50	0.09		Eisler, 1991 (review)
Salvelinus fontinalis, sac fry	Y	F	-	7.76	220	nw	96 h	LC50	0.108-0.518	k	Smith et al., 1978
POTASSIUM CYANIDE											
protozoa											
Spirostomum ambiguum	N	S	-	7.5	150	am	24 h	EC50	1.28	o	Nalecz-Jawecki & Sawicki, 1998

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
Tetrahymena pyriformis	N	S	-	-	-	am	5 min	EC50	0.013	d	Nalecz-Jawecki & Sawicki, 1998
rotifera											
Brachionus calyciflorus	N	S	>97%	--	-	am	24 h	LC50	40.6		Calleja et al., 1994
crustacea											
Asellus aquaticus	N	S	-	-	167-190	tap	48 h	LC50	2.68		Tscheu-Schlueter & Skibba, 1986
Ceriodaphnia dubia	N	S	-	7.6-7.8	-	am	1 h	EC50	0.94	n	Lee et al., 1997
Ceriodaphnia dubia	N	S	-	7.6-7.8	-	am	48 h	EC50	2.52		Lee et al., 1997
Daphnia magna	N	S	>97%	--	-	am	24 h	LC50	0.26		Calleja et al., 1994
Daphnia magna	N	S	-	7.6-7.7	272	am	24 h	EC50	0.53		Bringmann & Kühn, 1977a
Daphnia magna	N	S	rg	7.6	-	am	24 h	EC50	0.61		Lilius et al., 1994
Streptocephalus proboscideus	N	S	>97%	--	-	am	24 h	LC50	1.4		Calleja et al., 1994
pisces											
Leuciscus idus melanotus	N	S	-	-	167-190	tap	96 h	LC50	0.21		Tscheu-Schlueter & Skibba, 1986
Oncothynchus mykiss	N	S	-	-	24-48	tap	96 h	LC50	0.097		Tscheu-Schlueter & Skibba, 1986
Perca flavescens	Y	F	ag	7.8	-	nw	144 h	LC50	0.10		Solbe et al.,1985
Poecilia reticulata	N	S	-	-	167-186	tap	96 h	LC50	0.8		Tscheu-Schlueter & Skibba, 1986
Rutilus rutilus	Y	F	ag	7.8	-	nw	168 h	LC50	0.11		Solbe et al., 1985
Salmo salar	Y	S	-	7.5-8.5	250	nw	24 h	LC50	0.073	l	Alabaster et al., 1983
Salmo salar	Y	S	-	7.5-8.5	250	nw	24 h	LC50	0.024	m	Alabaster et al., 1983
SODIUM CYANIDE											
bacteria											
activated sludge bacteria	N	S	rg	7.5	-	am	3 h	EC50	5.3		Klecka & Landi, 1985
Aeromonas hydrophila	N	S	-	6.7	-	am	18 h	EC50	25		Dutka & Kwan, 1981
Pseudomonas fluorescens	N	S	-	6.7	-	am	18 h	EC50	14		Dutka & Kwan, 1981
Spirillium volutans	N	S	-	6.7	-	am	120 min	EC50	83		Dutka & Kwan, 1981
Rhizobium meliloti	N	S	-	7.5	-	am	20 min	IC50	21	x	Botsford et al., 1997
crustacea											
Cyclops viridis	N	S	ag	7.0	-	tap	96 h	LC50	0.32	t	Sarkar, 1990
Cyclops viridis	N	S	ag	7.0	-	tap	96 h	LC50	0.31	u	Sarkar, 1990
Cyclops viridis	N	S	ag	7.0	-	tap	96 h	LC50	0.15	v	Sarkar, 1990
Daphnia sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.33	t	Sarkar, 1990
Daphnia sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.32	u	Sarkar, 1990

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
Daphnia sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.15	v	Sarkar, 1990
Diaptomus sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.31	t	Sarkar, 1990
Diaptomus sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.33	u	Sarkar, 1990
Diaptomus sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.15	v	Sarkar, 1990
insecta											
Corixa sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.47	t	Sarkar, 1990
Corixa sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.47	u	Sarkar, 1990
Corixa sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.48	v	Sarkar, 1990
Dyticus sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.46	t	Sarkar, 1990
Dyticus sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.47	u	Sarkar, 1990
Dyticus sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.49	v	Sarkar, 1990
Nepa sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.55	t	Sarkar, 1990
Nepa sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.55	u	Sarkar, 1990
Nepa sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.46	v	Sarkar, 1990
Ranatra sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.43	t	Sarkar, 1990
Ranatra sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.44	u	Sarkar, 1990
Ranatra sp.	N	S	ag	7.0	-	tap	96 h	LC50	0.43	v	Sarkar, 1990
mollusca											
Goniobasis livescens	N	S	ag	8.0-8.6	137-171	nw	48 h	LC50	760		Cairns et al., 1976
Lymnaea emarginata angulata	N	S	ag	8.0-8.6	137-171	nw	48 h	LC50	3.3		Cairns et al., 1976
Lymnaea leuteola	N	S	ag	7.0	-	tap	96 h	LC50	2.48	t	Sarkar, 1990
Lymnaea leuteola	N	S	ag	7.0	-	tap	96 h	LC50	2.53	u	Sarkar, 1990
Lymnaea leuteola	N	S	ag	7.0	-	tap	96 h	LC50	2.48	v	Sarkar, 1990
Physa integra	N	S	ag	8.0-8.6	137-171	nw	48 h	LC50	1.35		Cairns et al., 1976
Pila globosa	N	S	ag	7.0	-	tap	96 h	LC50	2.96	t	Sarkar, 1990
Pila globosa	N	S	ag	7.0	-	tap	96 h	LC50	2.90	u	Sarkar, 1990
Pila globosa	N	S	ag	7.0	-	tap	96 h	LC50	1.68	v	Sarkar, 1990
Planorbis exustus	N	S	ag	7.0	-	tap	96 h	LC50	2.98	t	Sarkar, 1990
Planorbis exustus	N	S	ag	7.0	-	tap	96 h	LC50	2.92	u	Sarkar, 1990
Planorbis exustus	N	S	ag	7.0	-	tap	96 h	LC50	1.64	v	Sarkar, 1990
Viviparus bengalensis	N	S	ag	7.0	-	tap	96 h	LC50	2.90	t	Sarkar, 1990
Viviparus bengalensis	N	S	ag	7.0	-	tap	96 h	LC50	2.97	u	Sarkar, 1990

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
Viviparus bengalensis	N	S	ag	7.0	-	tap	96 h	LC50	2.89	v	Sarkar, 1990
pisces											
Catla catla	N	S	ag	7.0	-	tap	96 h	LC50	1.76	t	Sarkar, 1990
Catla catla	N	S	ag	7.0	-	tap	96 h	LC50	1.73	u	Sarkar, 1990
Catla catla	N	S	ag	7.0	-	tap	96 h	LC50	0.56	v	Sarkar, 1990
Cirrhinus migralis	N	S	ag	7.0	-	tap	96 h	LC50	1.52	t	Sarkar, 1990
Cirrhinus migralis	N	S	ag	7.0	-	tap	96 h	LC50	1.58	u	Sarkar, 1990
Cirrhinus migralis	N	S	ag	7.0	-	tap	96 h	LC50	0.37	v	Sarkar, 1990
Labeo bata	N	S	ag	7.0	-	tap	96 h	LC50	1.88	t	Sarkar, 1990
Labeo bata	N	S	ag	7.0	-	tap	96 h	LC50	1.97	u	Sarkar, 1990
Labeo bata	N	S	ag	7.0	-	tap	96 h	LC50	0.47	v	Sarkar, 1990
Labeo calbasu	N	S	ag	7.0	-	tap	96 h	LC50	1.98	t	Sarkar, 1990
Labeo calbasu	N	S	ag	7.0	-	tap	96 h	LC50	1.94	u	Sarkar, 1990
Labeo calbasu	N	S	ag	7.0	-	tap	96 h	LC50	0.41	v	Sarkar, 1990
Labeo rohita	N	S	ag	7.0	-	tap	96 h	LC50	1.95	t	Sarkar, 1990
Labeo rohita	N	S	ag	7.0	-	tap	96 h	LC50	1.97	u	Sarkar, 1990
Labeo rohita	N	S	ag	7.0	-	tap	96 h	LC50	0.38	v	Sarkar, 1990
Tilapia mosambica	N	S	ag	7.0	-	tap	96 h	LC50	2.01	t	Sarkar, 1990
Tilapia mosambica	N	S	ag	7.0	-	tap	96 h	LC50	1.97	u	Sarkar, 1990
Tilapia mosambica	N	S	ag	7.0	-	tap	96 h	LC50	0.37	v	Sarkar, 1990

* All values expressed as CN^-

a respons varied between season (lowest value was found in winter) and between exercised and non-exercised fish (values lower for non-exercised fish) ; temp. 12° C

b tests performed at 12 and 18° C; lowest value was found at 12° C, highest at 18° C; non-exercised fish

c sealed bipartite vessels in which a KHCO3/K2CO3 buffer to supply the algae with CO2

d oxygen uptake rate; cited in Nalecz-Jawecki & Sawicki, 1998

e 7 tests performed at different temperatures (15.2-25 °C), dissolved oxygen (3.51-7.25 mg/l) and pH-values (7.72-8.00)

f 5 tests performed at different temperatures (15-24-9 °C), dissolved oxygen (3.77-5.14 mg/l) and pH-values (7.84-8.02)

g 10 tests performed at different temperatures (15-25.2 °C), dissolved oxygen (3.58-7.04 mg/l) and pH-values (7.70-7.98)

h 4 tests performed at different temperatures (20-24.9 °C), dissolved oxygen (3.59-6.81 mg/l) and pH-values (7.72-7.93)

i 10 tests performed at different temperatures (8.4-25.1 °C), dissolved oxygen (3.48-8.35mg/l) and pH-values (7.7-8.12)

j 6 tests performed at different temperatures (15-21.4 °C), dissolved oxygen (3.56-7.10 mg/l) and pH-values (7.69-7.83)
k 4 tests performed at different temperatures (10-13 °C), dissolved oxygen (3.50-7.84 mg/l) and pH-values (7.68-7.84)
l DO 10 mg/l; un-ionized HCN
m DO 3.5 mg/l; un-ionized HCN
n algal uptake suppression test
o deformations of the cell
p reduction in dividing spermatogonia
q 6 °C
r 12 °C
s 18 °C
t 21.5 °C
u 26.5°C
v 31.4 °C
w effect growth
x inhibition of dye reduction

Table I. 2: Acute toxicity of free cyanide to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
HYDROGEN CYANIDE											
crustacea											
Gammarus pseudolimnaeus	-	-	-	-	-	-	96 h	LC50	0.058	b	Eisler, 1991 (review)
Gammarus pseudolimnaeus	-	-	-	-	-	-	96 h	LC50	0.184	c	Eisler, 1991 (review)
POTASSIUM CYANIDE											
bacteriophyta											
Photobacterium phosphoreum	N	S	>97%	--	-	am	5 min	EC50	4.66		Calleja et al., 1994
Photobacterium phosphoreum	N	S	-	-	-	am	5 min	EC50	2.5		Chang et al., 1981
crustacea											
Artemia salina	N	S	>97%	--	-	am	24 h	LC50	4.37		Calleja et al., 1994
Mysidopsis bahia, 24-h-old	N	F	-	7.8-8.2	30	nw	96 h	LC50	0.113		Lussier et al., 1985
SODIUM CYANIDE											
bacteriophyta											

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
Photobacterium phosphoreum	N	S	-	6.7	-	am	15 min	EC50	2.8		Dutka & Kwan, 1981
algae											
Nitschia closterium	Y	S	ag	8.0	-	nw	72 h	EC50	0.057		Pablo et al., 1997 c
mollusca											
Chlamys asperrimus, larvae	N	S	ag	-	31.6	nw	48 h	EC50	0.029	a	Pablo et al., 1997 a
crustacea											
Penaeus monodon, larvae	N	S	>97%	8	31.6	nw	96 h	LC50	0.11		Pablo et al., 1997 b

* All values expressed as CN^-

a larval abnormality

b 20 °C

c 5.2 °C

Table I. 3: Chronic toxicity of free cyanide to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
HYDROGEN CYANIDE											
crustacea											
Asellus communis	-	-	-	-	-	-	11d	NOEC	0.028		Eisler, 1991 (review)
pisces											
Lepomis macrochirus, adults	Y	F	-	8.09	-	-	289 d	NOEC	0.0483	a	Kimball et al., 1978
Lepomis macrochirus, eggs	Y	F	-	8.02-8.07	-	-	57 d	NOEC	0.0088	a	Kimball et al., 1978
Pimephales promelas	Y	F	-	8.06-8.09	-	nw	107 d	NOEC	0.0122	d	Lind et al., 1977
Pimephales promelas	Y	F	-	8.06-8.09	-	nw	256	NOEC	0.0345	e	Lind et al., 1977
Pimephales promelas	Y	F	-	8.06-8.09	-	nw	56 d	NOEC	0.0503	f	Lind et al., 1977
Salmo salar, eggs	Y	F	-	7.6	-	tap	103-151 d	NOEC	< 0.01	b	Leduc, 1977
Salvelinus fontinalis	Y	F	-	7.9-8.1	236	nw	144 d	NOEC	0.0055	d	Koenst et al., 1977
Salvelinus fontinalis, eggs	Y	F	-	7.9-8.1	236	nw	12 d	NOEC	0.0519	g	Koenst et al., 1977
Salvelinus fontinalis, embryo	Y	F	-	7.9-8.1	236	nw	30 d	NOEC	0.0109	h	Koenst et al., 1977
Salvelinus fontinalis, embryo	Y	F	-	7.9-8.1	236	nw	60 d	NOEC	0.0211	h	Koenst et al., 1977
Salvelinus fontinalis, embryo	Y	F	-	7.9-8.1	236	nw	90 d	NOEC	0.042	a	Koenst et al., 1977

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
POTASSIUM CYANIDE											
cyanophyta											
Anabaena flosaquae	Y	S	-	~ 7		am	10 d	NOEC	> 0.7		Shehata et al., 1988
Microcystis aeruginosa	N	S	-	7	28.7	am	8 d	NOEC	0.07		Bringmann & Kühn, 1978b
protozoa											
Chilomonas paramecium	N	S	-	6.9	42.3	am	48 h	NOEC	1.2		Bringmann et al., 1980
Entosiphon sulcatum	N	S	-	6.9	35.3	am	72 h	NOEC	1.8		Bringmann & Kühn, 1980a
bacteriophyta											
Pseudomonas putida	N	S	-	7	42.5	am	16 h	NOEC	0.001		Bringmann & Kühn, 1980a
algae											
Ankistrodesmus falcatus	N	S	-	-	19	am	10 d	NOEC	0.27	h	Tscheu-Schlueter & Skibba, 1986
Scenedesmus quadricauda	N	S	-	7	28.7	am	8 d	NOEC	0.03		Bringmann & Kühn, 1980a
Scenedesmus quadricauda	Y	S	-	7 – 10.3		am	10 d	NOEC	0.3		Shehata et al., 1988
pisces											
Oncorhynchus mykiss, gametes	Y	S	-	9.0	-	am	15 min	NOEC	0.00004	i	Billard & Roubaud, 1985
SODIUM CYANIDE											
protozoa											
Uronema parduczi	N	S	-	6.9	35.3	am	20 h	NOEC	0.27		Bringmann & Kühn, 1980b

* All values expressed as CN^-. In cyanide solutions at 25 °C and pH 8.1, 93% of free cyanide (expressed as HCN) is in the molecular form

a mortality
b hatching success and larval abnormality
c incubation time before hatch varied with temperature
d egg production
e hatchability
f weight and length of the second generation
g egg viability
h growth
i insemination

Table I. 4: Chronic toxicity of free cyanide to marine organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
POTASSIUM CYANIDE											
crustacea											
Mysidopsis bahia	N	F	-	7.8-8.2	30	nw	29 d	NOEC	>0.043	a	Lussier et al., 1985
Mysidopsis bahia	N	F	-	7.8-8.2	30	nw	29 d	NOEC	0.043	b	Lussier et al., 1985

* All values expressed as CN^-

a reproduction

b mortality

Table I. 5: Acute toxicity of cyanide complexes to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
pisces											
Oncorhynchus mykiss	N	S	-	-	24-48	tap	96 h	LC50	0.19	a	Tscheu-Schlueter & Skibba, 1986
Poecilia reticulata	N	S	-	-	167-186	tap	96 h	LC50	0.9	a	Tscheu-Schlueter & Skibba, 1986

* All values expressed as CN^-

a $Na_3[Cu(CN)_4]$

Table I. 6: Acute toxicity of cyanide complexes to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
algae											
Nitschia closterium	Y	S	ag	8.0	-	nw	72 h	EC50	0.127	b	Pablo et al., 1997 c
Nitschia closterium	Y	S	ag	8.0	-	nw	72 h	EC50	0.275	c	Pablo et al., 1997 c
mollusca											
Chlamys asperrimus, larvae	N	S	ag	-	31.6	nw	48 h	EC50 b	0.13	ab	Pablo et al., 1997a
Chlamys asperrimus, larvae	N	S	ag	-	31.6	nw	48 h	EC50 b	0.69	ac	Pablo et al., 1997a
crustacea											
Penaeus monodon, larvae	N	S	>97%	8	31.6	nw	96 h	LC50	9.1	b	Pablo et al., 1997 b

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
Penaeus monodon, larvae	N	S	>97%	8	31.6	nw	96 h	LC50	60.8	c	Pablo et al., 1997 b
Penaeus monodon, larvae	N	S	>97%	9	31.6	nw	96 h	LC50	2.70	b	Pablo et al., 1997 b
Penaeus monodon, larvae	N	S	>97%	9	31.6	nw	96 h	LC50	2.41	c	Pablo et al., 1997 b

* All values expressed as CN^-

a larval abnormality

b $K_3Fe(CN)_6$

c $K_4Fe(CN)_6$

Table I. 7: Chronic toxicity of cyanide complexes to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
algae											
Ankistrodesmus falcatus	N	S	-	-	19	am	10 d	NOEC	0.026	a	Tscheu-Schlueter & Skibba, 1986

* All values expressed as CN^-

a growth; $Na_3[Cu(CN)_4]$

Table I. 8: Chronic toxicity of cyanide complexes to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
algae											
Nitschia closterium	Y	S	ag	8.0	-	nw	72 h	NOEC	0.031	a	Pablo et al., 1997 c
Nitschia closterium	Y	S	ag	8.0	-	nw	72 h	NOEC	0.031	b	Pablo et al., 1997 c

* All values expressed as CN^-

a $K_3Fe(CN)_6$

b $K_4Fe(CN)_6$

Table I. 9: Acute toxicity of thiocyanates to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
crustacea											
Daphnia magna	Y	S	rg	5	75	tap	96 h	LC50	3.52	i	Watson & Maly, 1987
Daphnia magna	Y	S	rg	5	75	tap	96 h	LC50	1.90	b	Watson & Maly, 1987
Daphnia magna	Y	S	rg	5	75	tap	96 h	LC50	0.63	j	Watson & Maly, 1987
Daphnia magna	Y	S	rg	6	75	tap	96 h	LC50	14.57	i	Watson & Maly, 1987
Daphnia magna	Y	S	rg	6	75	tap	96 h	LC50	10.1	b	Watson & Maly, 1987
Daphnia magna	Y	S	rg	6	75	tap	96 h	LC50	1.42	j	Watson & Maly, 1987
Daphnia magna	Y	S	rg	7	75	tap	96 h	LC50	32.09	i	Watson & Maly, 1987
Daphnia magna	Y	S	rg	7	75	tap	96 h	LC50	19.32	b	Watson & Maly, 1987
Daphnia magna	Y	S	rg	7	75	tap	96 h	LC50	3.21	j	Watson & Maly, 1987
Daphnia magna	N	S	rg	-	-	-	48 h	LC50	57.4	k	Parkhurst et al., 1979
Daphnia magna	N	S	ag	7	1.86	tap	48 h	EC50	3.02	g	Zhang et al., 1998
pisces											
Aristichthys nobilis	N	S	ag	7	1.86	tap	96 h	LC50	396	g	Zhang et al., 1998
Carassius auratus gibelio	N	S	ag	7	1.86	tap	96 h	LC50	139	g	Zhang et al., 1998
Ctenophayngodon edellus	N	S	ag	7	1.86	tap	96 h	LC50	303	g	Zhang et al., 1998
Cyprinus carpia	N	S	ag	7	1.86	tap	96 h	LC50	219	g	Zhang et al., 1998
Hypophthalmichthys molitrix	N	S	ag	7	1.86	tap	96 h	LC50	486	g	Zhang et al., 1998
Oncorhynchus mykiss	Y	S	rg	6	75	nw	96 h	LC50	250	a	Speyer & Raymond, 1988
Oncorhynchus mykiss	Y	S	rg	6	75	nw	96 h	LC50	177	b	Speyer & Raymond, 1988
Oncorhynchus mykiss	Y	S	rg	8	75	nw	96 h	LC50	218	a	Speyer & Raymond, 1988
Oncorhynchus mykiss	Y	S	rg	8	75	nw	96 h	LC50	264	b	Speyer & Raymond, 1988
Oncorhynchus mykiss, 1-d-old	Y	S	98%	7.45	352	nw	96 h	LC50	244	f	Kevan & Dixon, 1996
Oncorhynchus mykiss, 10-d-old	Y	S	98%	7.45	352	nw	96 h	LC50	191	f	Kevan & Dixon, 1996
Oncorhynchus mykiss, 1-d-old	Y	S	99.6%	7.75	352	nw	96 h	LC50	233	g	Kevan & Dixon, 1996
Oncorhynchus mykiss, 10-d-old	Y	S	99.6%	7.75	352	nw	96 h	LC50	250	g	Kevan & Dixon, 1996
Oncorhynchus mykiss, juvenile	Y	F	98%	7.79	353	nw	144 h	LC50	141	f	Kevan & Dixon, 1996
Oncorhynchus mykiss, juvenile	Y	F	99.6	7.64	353	nw	144 h	LC50	83	g	Kevan & Dixon, 1996
Oncorhynchus mykiss, 0.7 g	Y	F	rg	7.95	202	am	96 h	LC50	20.8		Heming et al., 1985
Oncorhynchus mykiss, 0.7 g	Y	F	rg	7.95	202	am	97.25 h	LC50	< 7.7	d	Heming et al., 1985

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
Oncorhynchus mykiss, 4.1 g	Y	F	rg	8.1	152	tap	96 h	LC50	> 94		Heming & Blumhagen, 1989
Oncorhynchus mykiss, 4.1 g	Y	F	rg	8.1	152	tap	97 h	LC50	25	h	Heming & Blumhagen, 1989
Parabramis pekinensis	N	S	ag	7	1.86	tap	96 h	LC50	267	g	Zhang et al., 1998
Pimephales promelas	Y	S	-	7.2-7.9	40-48	tap	96 h	LC50	0.15	l	Curtis & Ward, 1981
Salvelinus fontinalis, 8.9 g	Y	F	rg	7.86	194	am	96 h	LC50	> 16.7		Heming et al., 1985
Salvelinus fontinalis, 8.9 g	Y	F	rg	7.86	194	am	96.25 h	LC50	7.8	e	Heming et al., 1985
Tilapia mossambica	N	S	ag	7	1.86	tap	96 h	LC50	74.5	g	Zhang et al., 1998
macrophyta											
Lemna minor	N	S	ag	-	-	-	96 h	EC50	3663	c	Zhang & Hongjun, 1997
amphibia											
Bufo bufo gargarizans	N	S	ag	7	1.86	tap	96 h	LC50	279	g	Zhang et al., 1998
Rana nigromaculata	N	S	ag	7	1.86	tap	96 h	LC50	230	g	Zhang et al., 1998
insecta											
Chironomus sp.	N	S	ag	7	1.86	tap	48 h	LC50	250	g	Zhang et al., 1998
annelida											
Limnodrilus hoffmeisteri	N	S	ag	7	1.86	tap	96 h	LC50	1211	g	Zhang et al., 1998

* All values expressed as SCN^-

a temperature 5° C, KSCN was tested

b

c growth rate inhibition; NaSCN was tested

d fish were stressed for 15 sec. after 96 h exposure; mortality was measured 1.25 h later; KSCN was tested

e fish were stressed for 5 sec. after 96 h exposure; mortality was measured 0.25 h later; KSCN was tested

f KSCN was tested

g NaSCN was tested

h fish were stressed for 30 sec. after 96 h exposure; mortality was measured 1 h later; KSCN was tested

i temperature 8° C; KSCN was tested

j temperature 16° C; KSCN was tested

k tested species not given

l **mercuric** thiocyanate (**Hg**SCN) was tested

Table I. 10: Acute toxicity of thiocyanates to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
crustacea											
Palaemonetes pugio	Y	S	-	8.3-8.7	25 o/oo	am	96 h	LC50	0.09	a	Curtis & Ward, 1981

* All values expressed as SCN^-

a **mercuric** thiocyanate (**Hg**SCN) was tested

Table I. 11: Chronic toxicity of thiocyanates to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
crustacea											
Daphnia magna, < 24 h	N	S	ag	7	1.86	tap	21 d	NOEC	0.36	il	Zhang et al., 1998
Daphnia magna, < 24 h	N	S	ag	7	1.86	tap	21 d	NOEC	1.43	ie	Zhang et al., 1998
pisces											
Carassius auratus gibelio, fry	N	F	ag	7	1.86	tap	60 d	NOEC	9.7	ie	Zhang et al., 1998
Carassius auratus gibelio, fry	N	F	ag	7	1.86	tap	60 d	NOEC	5.1	im	Zhang et al., 1998
Oncorhynchus mykiss, eggs	Y	S	98%	7.2	379	nw	3 d	NOEC	475	ehj	Kevan & Dixon, 1991
Oncorhynchus mykiss, eggs	Y	S	98%	7.2	379	nw	3 d	NOEC	< 85	fhj	Kevan & Dixon, 1991
Oncorhynchus mykiss, eggs	Y	S	98%	7.2	379	nw	3 d	NOEC	1240	ghj	Kevan & Dixon, 1991
Oncorhynchus mykiss, eggs	Y	S	98%	7.2	379	nw	3 d	NOEC	630	ehk	Kevan & Dixon, 1991
Oncorhynchus mykiss, eggs	Y	S	98%	7.2	379	nw	3 d	NOEC	< 90	fhk	Kevan & Dixon, 1991
Oncorhynchus mykiss, eggs	Y	S	98%	7.2	379	nw	3 d	NOEC	630	ghk	Kevan & Dixon, 1991
Oncorhynchus mykiss, eggs	Y	S	99.6%	7.2	379	nw	3 d	NOEC	>2700	egij	Kevan & Dixon, 1991
Oncorhynchus mykiss, eggs	Y	S	99.6%	7.2	379	nw	3 d	NOEC	1350	fij	Kevan & Dixon, 1991
Oncorhynchus mykiss, eggs	Y	S	99.6%	7.2	379	nw	3 d	NOEC	>2700	fgik	Kevan & Dixon, 1991
Oncorhynchus mykiss, eggs	Y	S	99.6%	7.2	379	nw	3 d	NOEC	470	eik	Kevan & Dixon, 1991
Oncorhynchus mykiss.juv.	Y	F	rg	7.68	382	nw	112 d	NOEC	77	e	Lanno & Dixon, 1996a,b
Pimephales promelas	Y	F	-	7.7-7.8	372	nw	124 d	NOEC	1.1	a	Lanno & Dixon, 1994
Pimephales promelas	Y	F	-	7.7-7.8	372	nw	124 d	NOEC	16.6	b	Lanno & Dixon, 1994
Pimephales promelas	Y	F	-	7.7-7.8	372	nw	124 d	NOEC	7.3	c	Lanno & Dixon, 1994
Pimephales promelas	Y	F	-	7.7-7.8	372	nw	56 d	NOEC	7.3	d	Lanno & Dixon, 1994

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l] *	note	reference
macrophyta											
Lemna minor	N	S	ag	7	1.86	tap	96 h	NOEC	774	in	Zhang et al., 1998
Lemna minor	N	S	ag	7	1.86	tap	96 h	NOEC	1834	io	Zhang et al., 1998

* All values expressed as SCN^-

a time to first spawn and egg production
b weight of F0 generation
c mortality of F0 generation
d survival of F1 generation at day 56
e mortality
f deformities
g fertilization succes
h KSCN was tested
i NaSCN was tested
j before water hardening (when perivitelline formation takes place)
k after water hardening (when the protective chorion membrane is formed)
l reproduction
m weight
n growth
o chlorophyll A content

Table I. 12: Toxicity of thiocyanates to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$] *	result stand. soil [$mg/kg_{d.w.}$] *	note	reference
annelida											
Limonius californicus	silt loam	6.0	2.9	18.5	22	24 h	LC50	7175		a	McCaffrey et al., 1995
						24 h	LC50	6160		a	McCaffrey et al., 1995

* All values expressed in SCN^-

a exposure to KSCN; soil contained 17 g total carbon per kg; mortality is after 48 h and 96 h recovery respectively.

Appendix II Toxicity data on non-halogenated monocyclic aromatic hydrocarbons compounds

In this appendix toxicity data on non-halogenated monocyclic aromatic hydrocarbons compounds are presented.

Content

Table II. 1: Acute toxicity of phenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	153		Bryant & Schultz, 1994
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	254		Schultz et al., 1986
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	196		Baerden & Schultz, 1997
bacteriophyta											
Activated sludge bacteria-	-	S	-	7.5	-	am	6 h	IC50	799	c	Klecka & Landi, 1985
Aeromonas hydrophila	-	S	-	6.7	-	am	18 h	EC50	1600	d	Dutka & Kwan, 1981
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	2300	f	Liu et al., 1982
Rhizobium meliloti	-	S	-	7.5	-	am	20 min	EC50	1433	j	Botsford et al., 1997
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	659	d	Nendza & Seydel, 1988
Pseudomonas fluorescens	-	S	-	6.7	-	am	18 h	EC50	880		Dutka & Kwan, 1981
Pseudomonas fluorescens	-	S	≥99%	7.2	-	dtw	20 min	EC50	458		Boyd et al., 1997
Pseudomonas putida	-	S	-	-	-	am	6 h	EC50	244	d	Slabbert, 1986
Spirillum volutans	-	S	-	6.7	-	am	120 min	EC50	300		Dutka & Kwan, 1981
algae											
Chlorella vulgaris	N	S	rg	7.5	-	am	96 h	EC50	370		Shigeoka et al., 1988
Pseudokirchneriella subspicata	N	S	rg	7.5	-	am	96 h	EC50	150		Shigeoka et al., 1988
Scenedesmus quadricauda	N	S	ag	8.4	127	nw	24 h	EC50	403		Tisler & Zagorc-Koncan, 1997
rotifera											
Brachionus calyciflorus	N	S	ag	-	-	am	24 h	LC50	112		Crisinel et al., 1994
crustacea											
Acanthodiaptomus denticornis, 3.2 mm	-	R	-	7.6	-	-	48 h	LC50	38		Alekseyev & Antipin, 1974
Acanthodiaptomus denticornis, 1.7 mm	-	R	-	7.6	-	-	48 h	LC50	110		Alekseyev & Antipin, 1974
Asellus aquaticus	Y	F	-	7.8	99.5	-	96 h	LC50	180		Green et al., 1985
Asellus aquaticus, 8.2 mm	-	R	-	7.6	-	-	48 h	LC50	15		Alekseyev & Antipin, 1974
Asellus aquaticus, juv. 4 mm	-	R	-	7.6	-	-	48 h	LC50	78		Alekseyev & Antipin, 1974
Asellus intermedius, 0.012 g	-	S	-	7.4	130	-	96 h	LC50	25		Ewell et al., 1986
Bythotrephes longimanus, 3 mm	-	R	-	7.6	-	-	48 h	LC50	126		Alekseyev & Antipin, 1974
Ceriodaphnia dubia	N	S	>99%	8.18	57.07	rtw	48 h	LC50	3.1		Oris et al., 1991
Ceriodaphnia dubia	-	S	-	8.2	90-110	nw	48 h	LC50	20		Cowgill & Milazzo, 1991

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Canthocamptus spp.	N	S	-	-	-	-	48 h	LC50	8.8		Rama Rao & Nath, 1983
Chaetocorophium c.f. lucasi	N	S	-	7.6	10	nw	96 h	EC50	8.1		Hickey & Martin, 1995
Cyclops vicinus, 1.6 mm	-	R	-	7.6	-	-	48 h	LC50	114		Alekseyev & Antipin, 1974
Cypris pubera, 2.1 mm	-	R	-	7.6	-	-	48 h	LC50	132		Alekseyev & Antipin, 1974
Cypris subglobosa, 0.67 mm	-	S	rg	7.9	204	dtw	96 h	LC50	72		Rao et al., 1983
Daphnia longispina, 2.5 mm	-	R	-	7.6	-	-	48 h	LC50	14		Alekseyev & Antipin, 1974
Daphnia magna, < 24 h	-	S	rg	7.6	-	am	24 h	EC50	9.1		Lilius et al., 1994
Daphnia magna, < 12 h	-	S	-	8.2	160-180	nw	48 h	LC50	13		Cowgill & Milazzo, 1991
Daphnia magna, < 24 h	-	S	-	8.0	157	nw	48 h	LC50	12.9		Gersich et al., 1986
Daphnia magna, < 24 h	-	S	-	-	100	-	48 h	LC50	23		Hermens et al., 1984
Daphnia magna, < 24 h	-	F	-	7.4	44.7	-	48 h	LC50	12.6		Holcombe et al., 1987
Daphnia magna, 1^{st}-2^{nd} instar	-	S	-	7.4	130	-	96 h	LC50	4		Ewell et al., 1986
Daphnia magna, < 24 h	-	S	-	7.8	140	-	48 h	LC50	20		Milleman et al., 1984
Daphnia magna, < 24 h	-	S	-	7.0-8.2	154.5	-	48 h	LC50	23.5		Randall & Knopp, 1980
Daphnia magna	N	S	ag	7.8	250	am	48 h	EC50	5.6		Crisinel et al., 1994
Daphnia magna,12-24 h	-	S	-	-	-	nw	48 h	EC50	6.6		Keen & Baillod, 1985
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	24 h	EC50	21		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	48 h	EC50	10		Kühn et al., 1989
Daphnia magna, 24 h	N	S	-	7.6	272	am	24 h	LC50	31		Bringmann & Kühn, 1977a
Daphnia magna, 24 h	N	S	-	8	250	am	24 h	LC50	12		Bringmann & Kühn, 1982
Daphnia magna, < 72 h	-	S	>95%	8	200	rw	24 h	EC50	37.2		Devillers et al., 1987
Daphnia magna, =< 24 h	-	S	≥80%	7.4-9.4	160-186	rnw	48 h	LC50	12		LeBlanc, 1980
Daphnia magna	-	S	rg	-	-	-	48 h	LC50	30		Parkhurst et al., 1979
Daphnia pulex	N	S	ag	8.4	127	nw	48 h	EC50	25		Tisler & Zagorc-Koncan, 1997
Daphnia pulex	-	R	-	7.6	-	-	48 h	LC50	18		Alekseyev & Antipin, 1974
Daphnia pulicaria	Y	F	-	8.1	707.3	nw	48 h	LC50	> 109		DeGraeve et al., 1980
Eudiaptomus gracilis, 1.8 mm	-	R	-	7.6	-	-	48 h	LC50	130		Alekseyev & Antipin, 1974
Gammarus fasciatus	-	-	-	-	-	-	48 h	LC50	7-35		Stephenson, 1983 (cited)
Gammarus fasciatus, 0.007 g	-	S	-	7.4	130	-	96 h	LC50	21		Ewell et al., 1986
Gammarus minus	-	S	-	7.8	140	nw	48 h	LC50	37		Milleman et al., 1984
Gammarus pulex		S	-	8.3	249	dtw	96 h	LC50	51		Stephenson, 1983
Gammarus pulex	Y	S	-	8.3	104	dtw	96 h	LC50	40		Stephenson, 1983

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Gammarus pulex	Y	F	-	7.8	99.5	-	96 h	LC50	69		Green et al., 1985
Lynceaus brachyuris, 4 mm	-	R	-	7.6	-	-	48 h	LC50	78		Alekseyev & Antipin, 1974
Polyphemus pediculus, 1.4 mm	-	R	-	7.6	-	-	48 h	LC50	57		Alekseyev & Antipin, 1974
Streptocephalus rubricaudatus, cyst	N	S	ag	-	-	am	24 h	LC50	36.3		Crisinel et al., 1994
Streptocephalus texanus, cyst	N	S	ag	-	-	am	24 h	LC50	21.9		Crisinel et al., 1994
insecta											
Baetis rhodani	Y	F	-	7.8	99.5	-	96 h	LC50	16		Green et al., 1985
Chironomus riparius	Y	S	-	7.8	99.5	-	96 h	LC50	240		Green et al., 1985
Chironomus tentans, 4^{th} instar	-	S	-	7.8	150	-	48 h	LC50	187		Franco et al., 1984
Chironomus tentans, 4^{th} instar	-	S	-	7.8	140	-	48 h	LC50	105		Milleman et al., 1984
Clinotanypus pinguis, 3^{rd}-4^{th} instar	-	S	-	7.8	150	-	48 h	LC50	81		Franco et al., 1984
Einfeldia natchitocheae, 3^{rd}-4^{th} instar	-	S	-	7.8	150	-	48 h	LC50	70		Franco et al., 1984
Hydropsyche angustipennis	Y	S	-	7.8	99.5	-	96 h	LC50	250		Green et al., 1985
Tanypus neopunctipennis, 3^{rd}-4^{th} instar	-	S	-	7.8	150	-	48 h	LC50	70		Franco et al., 1984
mollusca											
Anodonta complunata, 42 mm	-	R	-	7.6	-	-	48 h	LC50	500		Alekseyev & Antipin, 1974
Bithynia tentaculata, 8.2 mm	-	R	-	7.6	-	-	48 h	LC50	580		Alekseyev & Antipin, 1974
Dreissenia polymorpha, 10.4 mm	-	R	-	7.6	-	-	48 h	LC50	180		Alekseyev & Antipin, 1974
Goniobasis livescens	-	S	-	8.0-8.6	137-171	nw	48 h	LC50	320		Cairns et al., 1976
Indoplanorbis exustus	-	S	-	-	-	nw	96 h	LC50	126		Agrawal, 1987
Lymnaea acuminata	-	S	-	7.9	210	nw	96 h	LC50	129		Gupta & Rao, 1982
Lymnaea stagnalis	-	R	-	7.6	-	-	48 h	LC50	350		Alekseyev & Antipin, 1974
Physa fontinalis, 6.4 mm	-	R	-	7.6	-	-	48 h	LC50	320		Alekseyev & Antipin, 1974
Physa fontinalis, 2.9 mm	-	R	-	7.6	-	-	48 h	LC50	260		Alekseyev & Antipin, 1974
Physa gyrina, 7.5 mm	-	S	-	7.8	140	-	48 h	LC50	260		Milleman et al., 1984
Physa integra	-	S	-	8.0-8.6	137-171	nw	48 h	LC50	107		Cairns et al., 1976
Planorbis planorbis, 6.0 mm	-	R	-	7.6	-	-	48 h	LC50	520		Alekseyev & Antipin, 1974
Planorbis vortex, 4.4 mm	-	R	-	7.6	-	-	48 h	LC50	370		Alekseyev & Antipin, 1974
Radix ovata, juv., 3.5 mm	-	R	-	7.6	-	-	48 h	LC50	330		Alekseyev & Antipin, 1974
Sphaerium corneum, 10 mm	-	R	-	7.4	-	-	48 h	LC50	780		Alekseyev & Antipin, 1974
Sphearium novaezelandiae	N	S	-	7.6	10	nw	96 h	EC50	11.9		Hickey & Martin, 1995
Viviparus viviparus, 30.7 mm	-	R	-	7.6	-	-	48 h	LC50	420		Alekseyev & Antipin, 1974

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
annelida											
Dugesia tigrina, 0.006 g	-	S	-	7.4	130	-	96 h	LC50	32		Ewell et al., 1986
Lumbriculus variegatus	N	S	-	7.6	10	nw	96 h	EC50	35.6		Hickey & Martin, 1995
Limnodrilus hoffmeisteri	Y	S	-	7.8	99.5	-	96 h	LC50	780		Green et al., 1985
Polycelis felina	Y	S	-	7.8	99.5	-	96 h	LC50	88		Green et al., 1985
pisces											
Brachydanio rerio	Y	S	-	-	64	-	96 h	LC50	25		Razani et al., 1986
Brachydanio rerio	N	F	-	8.0	170	dtw	48 h	LC50	60		Slooff, 1979
Brachydanio rerio	N	S	-	7.5	-	-	96 h	LC50	27.8		Wellens, 1982
Brachydanio rerio	Y	F	rg	8.0-8.3	350-375	nw	96 h	LC50	29		Fogels & Sprague, 1977
Campostoma anomalum, 47.5 mm	N	S	-	7.8	45	rdw	48 h	LC50	17.9		Chagnon & Hlohowskyj, 1989
Catostomus commersoni, 2.4 g	Y	F	-	7.2	41-48	nw	96 h	LC50	10.6		Holcombe et al., 1987
Colisa fasciatus	-	S	tech	6.8-7.6	66	tw	96 h	LC50	32.7		Verma et al., 1980
Jordanella floridae	Y	F	rg	8.0-8.3	350-375	nw	96 h	LC50	36.3		Fogels & Sprague, 1977
Leuciscus idus melanotus	N	S	-	7-8	255	tap	48 h	LC50	14, 25		Juhnke & Lüdemann, 1978
Lebistes reticulatus, 0.09 g	N	S	-	7.9	228	-	96 h	LC50	47.5		Gupta et al., 1982
Lepomis macrochirus, 1.1 g	Y	F	-	7.2	41-48	nw	96 h	LC50	17.4		Holcombe et al., 1987
Notopterus notopterus	-	S	tech	6.8-7.6	66	tw	96 h	LC50	12.5		Verma et al., 1980
Oncorhynchus mykiss, 13.1 g	Y	F	-	7.2	41-48	nw	96 h	LC50	10.5		Holcombe et al., 1987
Oncorhynchus mykiss, 6.1 g	Y	F	-	8.1	707.3	nw	96 h	LC50	8.9		DeGraeve et al., 1980
Oncorhynchus mykiss	Y	F	rg	7.9	135	dtw	96 h	LC50	9.7	α	Hodson et al., 1984
Oncorhynchus mykiss	N	S	ag	8.4	127	nw	48 h	LC50	13.1		Tisler & Zagorc-Koncan, 1997
Oncorhynchus mykiss	Y	F	rg	8.0-8.3	350-375	nw	96 h	LC50	11.6		Fogels & Sprague, 1977
Pimephales promelas, 1.1 g	Y	F	-	8.1	707.3	nw	96 h	LC50	67.5	a	DeGraeve et al., 1980
Pimephales promelas, 1.4 g	Y	F	-	8.1	707.3	nw	96 h	LC50	24.9	b	DeGraeve et al., 1980
Pimephales promelas, 5g	-	R	-	-	-	-	48 h	LC50	44	e	Zhao & Wang, 1993
Pimephales promelas	N	F	-	-	-	-	96 h	LC50	37		Schultz et al., 1986
Pimephales promelas, 30-35 d	N	F	-			nw		LC50	29	b	Hall & Kier, 1984; Hall et al., 1984
Pimephales promelas	N	S	rg	7.9	96-125	nw	96 h	LC50	31.5	g	Mayes et al., 1983
Pimephales promelas	N	S	-	7.8	140	nw	96 h	LC50	25.6		Milleman et al., 1984
Pimephales promelas, 0.3 g	Y	F	-	7.2	41-48	nw	96 h	LC50	25.3		Holcombe et al., 1987
Poecilia reticulata	N	S	-	-	-	-	96 h	LC50	43		Shigeoka et al., 1988

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	31		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	30		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	37		Könemann & Musch, 1981
Rasbora heteromorpha, 1.3-3 cm	N	F	100	7.2	20	nw	48 h	LC50	7.4		Alabaster, 1969
Rasbora heteromorpha, 1.3-3 cm	N	F	100	7.2	250	nw	48 h	LC50	6.8		Alabaster, 1969
Rutilis rutilis	-	F	ag	7.8	257-260	nw	48 h	LC50	10		Solbé et al., 1985
Saccobranchus fossiliss	-	S	tech	6.8-7.6	66	tw	96 h	LC50	39.4		Verma et al., 1980
macrophyta											
Elodea canadensis	-	S	-	-	-	tap	9 d	EC50	235	h	Stom & Roth, 1981
Lemna gibba	-	S	-	4.8	636	am	7d	EC50	226-22	i	Cowgill et al., 1991
Lemna minor	-	S	-	4.8	636	am	7 d	EC50	223-312	i	Cowgill et al., 1991
Lemna minor	-	S	-	-	-	tap	12 d	EC50	169	h	Stom & Roth, 1981

a temperature 14 °C
b temperature 25 °C
c respiration inhibition
d bacterial growth inhibition
e calculated by QSAR
f dehydrogenase activity
g geometric mean of 96 h LC50 values found for fry, juvenile and subadults
h growth
i results for number of plants, number of fronds and dry weight
j dye reduction

Table II. 2: Acute toxicity of phenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
13 bacterial strains	-	S	ag	-	-	am	16 h	EC50	1300		Warne et al., 1989
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	21.6		Zhao & Wang, 1993
Vibrio fisheri	-	S	-	-	-	rw	5 min	EC50	25		Bulich et al., 1981
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	34.2		Ribo & Kaiser, 1983
Vibrio fisheri	N	S	ag	-	-	am	15 min	EC50	28.2		Crisinel et al., 1994
Vibrio fisheri	-	S	-	6.7	-	am	15 min	EC50	34		Dutka & Kwan, 1981
algae											
Skeletonema costatum	N	S	rg	8.2	-	am	120 h	EC50	50		Cowgill et al., 1989
echinodermata											
Strongylocentrotus droebachiensis, eggs	Y	S	99.5%	-	-	nw	96 h	EC50	> 30	c	Falk-Petersen et al., 1985
annelida											
Ophryotrocha diadema	N	S	-	-	32	nw	48 h	LC50	100-330		Parker, 1984
Platynereis dumerilii, embryos, < 6h	N	S	> 90%	-	35	nw	48 h	EC50	122	a	Palau-Casellas & Hutchinson, 1998
Platynereis dumerilii, 7-d-old larvae	N	S	> 90%	-	35	nw	96 h	LC50	75.7		Palau-Casellas & Hutchinson, 1998
crustacea											
Artemia salina, cysts	N	S	ag	-	35	rnw	24 h	LC50	28.2		Crisinel et al., 1994
Artemia salina, newly hatched	-	S	-	-	-	am	48 h	LC50	56		Price et al., 1974
Crangon septemspinosa, 2.4-4.5 g	N	S	-	-	30	nw	21 h	LC50	7.5		McLeese et al., 1979
Gammarus duebeni	Y	F	-	7.7	6	nw	96 h	LC50	76, 27	b	Oksama & Kristofferson, 1979
Mesidotea entomon	Y	F	-	7.7	6	nw	96 h	LC50	79		Oksama & Kristofferson, 1979
Panopeus herbstii	-	S	-	-	25	-	96 h	LC50	52.8		Key & Scott, 1986
pisces											
Gadus morhua, 1-d-old embryos	Y	S	99.5%	-	-	nw	96 h	EC50	> 30	c	Falk-Petersen et al., 1985
Phoxinus phoxinus	Y	F	-	7.7	6	nw	96 h	LC50	9.5		Oksama & Kristofferson, 1979

a normal embryo-larval development
b temperatures 5 and 16 °C, respectively
c development

Table II. 3: Chronic toxicity of phenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Chilomonas paramaecium	N	S	-	6.9	142	am	48 h	NOEC	65		Bringmann et al., 1980
Entosiphon sulcatum	N	S	-	6.9	142	am	72 h	NOEC	33		Bringmann, 1978
Uronema parduczi	N	S	-	6.9	142	am	20 h	NOEC	144		Bringmann & Kühn, 1980b
bacteriophyta											
Pseudomonas putida	N	S	-	7.0	60	am	16 h	NOEC	64		Bringmann & Kühn, 1976
mixed culture	N	S	ag	8.4	127	nw	120 h	NOEC	283		Tisler & Zagorc-Koncan, 1997
cyanophyta											
Microcystis aeruginosa	N	S	-	7.0	60	am	8 d	NOEC	4.6		Bringmann & Kühn, 1978a,b
algae											
Scenedesmus quadricauda	N	S	-	7.0	-	am	8 d	NOEC	7.5		Bringmann & Kühn, 1977b
crustacea											
Ceriodaphnia dubia	N	S	>99%	8.18	57.07	rtw	7 d	NOEC	2.5	e	Oris et al., 1991
Ceriodaphnia dubia	-	S	-	8.2	90-110	nw	10 d	NOEC	0.84	b	Cowgill & Milazzo, 1991
Ceriodaphnia dubia	-	S	-	8.2	90-110	nw	10 d	NOEC	6.5	fgh	Cowgill & Milazzo, 1991
Daphnia magna	N	R	-	8.2	199	-	16 d	NOEC	0.16	c	Deneer et al., 1988a,b
Daphnia magna, < 12 h	-	S	-	8.2	160-180	nw	12 d	NOEC	0.5	c	Cowgill & Milazzo, 1991
Daphnia magna, < 12 h	-	S	-	8.2	160-180	nw	12 d	NOEC	1.4	f	Cowgill & Milazzo, 1991
Daphnia magna, < 12 h	-	S	-	8.2	160-180	nw	12 d	NOEC	0.8	g	Cowgill & Milazzo, 1991
Daphnia magna, < 12 h	-	S	-	8.2	160-180	nw	12 d	NOEC	3.9	h	Cowgill & Milazzo, 1991
pisces											
Brachydanio rerio	Y	S	-	6.3	57-61	dtw	3 m	NOEC	4.9	b	Razani et al., 1986
Brachydanio rerio, eggs	Y	S	-	6.3	57-61	dtw	2 m	NOEC	2.2	cd	Razani et al., 1986
Oncorhynchus mykiss, eggs	Y	F	-	7.8	579.9	nw	58 d	NOEC	0.1	ci	DeGraeve et al., 1980
Pimephales promelas, eggs	Y	F	-	8.0	725.3	nw	30 d	NOEC	33.2	a	DeGraeve et al., 1980
Pimephales promelas, eggs	Y	F	-	8.0	725.3	nw	30 d	NOEC	0.75	c	DeGraeve et al., 1980

a hatchability
b survival
c growth
d eggs from adults exposed to the same concentrations of phenol
e reproduction (NOEC=MATC/2)

f total progeny
g number of broods
h mean brood size
i estimated by authors from LOEC of 0.2 mg/l and dose-response curves for *P. promelas* and *O. mykiss*.

Table II. 4: Chronic toxicity of phenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
algae											
Skeletonema costatum	N	S	rg	8.2	-	am	120 h	NOEC	13		Cowgill et al., 1989

Table II. 5: Toxicity of phenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$]	result stand. soil [$mg/kg_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.5	1.6	-	23	14 d	NOEC	32 a	160	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.5	1.6	-	23	7 d	NOEC	32 a	160	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	79 a	395	a	Hulzebos et al., 1993

a growth

Table II. 6: Acute toxicity of o-cresol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	213		Cronin & Schultz, 1996
insecta											
Chironomus gr. thummi	N	S	>98%	8.2	200	am	48 h	LC50	34		Slooff, 1983
Cloëon dipterum	N	S	>98%	8.2	200	am	48 h	LC50	50		Slooff, 1983
Corixa punctata	N	S	>98%	8.2	200	am	48 h	LC50	80		Slooff, 1983
Ischnura elegans	N	S	>98%	8.2	200	am	48 h	LC50	46		Slooff, 1983
Nemoura cinerea	N	S	>98%	8.2	200	am	48 h	LC50	10		Slooff, 1983
coelenterata											
Hydra oligactis	N	S	>98%	8.2	200	am	48 h	LC50	75		Slooff, 1983
annelida											
Dugesia cf. lugubris	N	S	>98%	8.2	200	am	48 h	LC50	24		Slooff, 1983
Erpobdella octoculata	N	S	>98%	8.2	200	am	48 h	LC50	135		Slooff, 1983
Tubificidae	N	S	>98%	8.2	200	am	48 h	LC50	165		Slooff, 1983
mollusca											
Lymnaea stagnalis	N	S	>98%	8.2	200	am	48 h	LC50	160		Slooff, 1983
crustacea											
Asellus aquaticus	N	S	>98%	8.2	200	am	48 h	LC50	23		Slooff, 1983
Daphnia cucullata, 11 d	N	S	>=98%	7.9	100	am	48 h	LC50	16.4		Canton & Adema, 1978
Daphnia magna, < 1 d	N	S	>=98%	7.9	100	am	48 h	LC50	9.2	a	Canton & Adema, 1978
Daphnia magna, < 1 d	N	S	>=98%	7.9	100	am	48 h	LC50	23.5	a	Canton & Adema, 1978
Daphnia magna, < 1 d	N	S	>=98%	7.9	100	am	48 h	LC50	14.5	a	Canton & Adema, 1978
Daphnia magna, 24 h	N	S	-	7.6	272	am	24 h	LC50	19		Bringmann & Kühn, 1977a
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	17.9		Devillers et al., 1987
Daphnia magna	-	S	rg	-	-	-	48 h	LC50	5		Parkhurst et al., 1979
Daphnia pulex, < 1 d	N	S	>+98%	7.9	100	am	48 h	LC50	9.6		Canton & Adema, 1978
Daphnia pulicaria	Y	F	-	8.1	707.3	nw	48 h	LC50	> 94		DeGraeve et al., 1980
Gammarus pulex	N	S	>98%	8.2	200	am	48 h	LC50	21		Slooff, 1983
pisces											
Brachydanio rerio	N	S	-	7.5	-	-	96 h	LC50	24		Wellens, 1982

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Carassius auratus, 1-2 g	N	S	-	7.5	20	nw	96 h	LC50	23.3		Pickering & Henderson, 1966
Lepomis macrochirus, 1-2 g	N	S	-	7.5	20	nw	96 h	LC50	20.8		Pickering & Henderson, 1966
Oncorhynchus mykiss, 5.1 g	Y	F	-	8.1	707.3	nw	96 h	LC50	8.4		DeGraeve et al., 1980
Pimephales promelas, 1.5 g	Y	F	-	8.1	707.3	nw	96 h	LC50	18.2		DeGraeve et al., 1980
Pimephales promelas, 1-2 g	N	S	-	7.5	20	nw	96 h	LC50	12.6		Pickering & Henderson, 1966
Pimephales promelas, 1-2 g	N	S	-	8.2	360	nw	96 h	LC50	13.4		Pickering & Henderson, 1966
Pimephales promelas	N	S	-	7.7	47	-	96 h	LC50	14		Geiger et al., 1990
Poecilia reticulata, 0.1-0.2 g	N	S	-	7.5	20	nw	96 h	LC50	18.9		Pickering & Henderson, 1966
amphibia											
Ambystoma mexicanum, 3-4 w after hatching	-	S	-	8.2	200	DSW	48 h	LC50	40		Slooff & Baerselman, 1980
Xenopus laevis, 3-4 w after hatching	-	S	-	8.2	200	DSW	48 h	LC50	38		Slooff & Baerselman, 1980

a 3 different experiments performed in 2 different laboratoria

Table II. 7: Acute toxicity of o-cresol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	19		Zhao & Wang, 1993
Vibrio fisheri	-	S	-	-	-	am	5 min	EC50	11		Chang et al., 1981
Vibrio fisheri	N	S	-	-	-	am	15 min	EC50	25.9		Cronin & Schultz, 1997
crustacea											
Elasmopus pectenicrus	N	S	-	-	30	am	96 h	LC50	10.2		Lee & Nicol, 1978
echinodermata											
Strongylocentrotus droebachiensis, eggs	Y	S	98%	-	-	nw	96 h	EC50	30	a	Falk-Petersen et al., 1985
pisces											
Gadus morhua, 1-d-old embryos	Y	S	98%	-	-	nw	96 h	EC50	12	a	Falk-Petersen et al., 1985

a development

Table II. 8: Chronic toxicity of o-cresol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Chilomonas paramaecium	N	S	-	6.9	142	am	48 h	NOEC	132		Bringmann et al., 1980
Entosiphon sulcatum	N	S	-	6.9	142	am	72 h	NOEC	17		Bringmann, 1978
Uronema parduczi	N	S	-	6.9	142	am	20 h	NOEC	31		Bringmann & Kühn, 1980b
bacteriophyta											
Pseudomonas putida	N	S	-	7.0	60	am	16 h	NOEC	33		Bringmann & Kühn, 1976
cyanophyta											
Microcystis aeruginosa	N	S	-	7.0	60	am	8 d	NOEC	6.8		Bringmann & Kühn, 1978a,b
algae											
Chlorella pyrenoidosa	N	S	>98%	8.2	200	am	48 h	NOEC	34		Slooff et al., 1983
Scenedesmus pannonicus	N	S	-	8.2	200	am	48 h	NOEC	36		Slooff et al., 1983
Scenedesmus quadricauda	N	S	-	7.0	-	am	8 d	NOEC	11		Bringmann & Kühn, 1977b
Selenastrum capricornutum	N	S	>98%	8.2	200	am	96 h	NOEC	65		Slooff et al., 1983

Table II. 9: Toxicity of o-cresol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$]	result stand. soil [$mg/kg_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.5	1.6	-	23	14d	NOEC	32	160	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.5	1.6	-	23	7 d	NOEC	10	50	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	> 100	> 500	a	Hulzebos et al., 1993

a growth

Table II. 10: Acute toxicity of m-cresol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	125		Cronin & Schultz, 1996
crustacea											
Daphnia magna, 24 h	N	S	-	8	250	am	24 h	LC50	25		Bringmann & Kühn, 1982
Daphnia magna, 24 h	N	S	-	7.6	272	am	24 h	LC50	8.9		Bringmann & Kühn, 1977a
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	19.2		Devillers et al., 1987
Daphnia magna	-	S	rg	-	-	-	48 h	LC50	18.8		Parkhurst et al., 1979
Daphnia pulicaria	Y	F	-	8.1	707.3	nw	48 h	LC50	> 99.5		DeGraeve et al., 1980
pisces											
Brachydanio rerio	N	S	-	7.5	-	-	96 h	LC50	15.9		Wellens, 1982
Leuciscus idus melanotus	N	S	-	7-8	255	tap	48 h	LC50	18		Juhnke & Lüdemann, 1978
Oncorhynchus mykiss, 6.0 g	Y	F	-	8.1	707.3	nw	96 h	LC50	8.9		DeGraeve et al., 1980
Pimephales promelas, 1.6 g	Y	F	-	8.1	707.3	nw	96 h	LC50	55.9		DeGraeve et al., 1980

Table II. 11: Acute toxicity of m-cresol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	N	S	-	-	-	am	15 min	EC50	7.5		Cronin & Schultz, 1997
echinodermata											
Strongylocentrotus droebachiensis, eggs	Y	S	98%	-	-	nw	96 h	EC50	30	a	Falk-Petersen et al., 1985
pisces											
Gadus morhua, 1-d-old embryos	Y	S	98%	-	-	nw	96 h	EC50	> 30	a	Falk-Petersen et al., 1985

a: development

Table II. 12: Chronic toxicity of m-cresol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Chilomonas paramaecium	N	S	-	6.9	142	am	48 h	NOEC	114		Bringmann et al., 1980
Entosiphon sulcatum	N	S	-	6.9	142	am	72 h	NOEC	31		Bringmann, 1978
Uronema parduczi	N	S	-	6.9	142	am	20 h	NOEC	62		Bringmann & Kühn, 1980b
bacteriophyta											
Pseudomonas putida	N	S	-	7.0	60	am	16 h	NOEC	53		Bringmann & Kühn, 1976
cyanophyta											
Microcystis aeruginosa	N	S	-	7.0	60	am	8 d	NOEC	13		Bringmann & Kühn, 1978a,b
algae											
Scenedesmus quadricauda	N	S	-	7.0	-	am	8 d	NOEC	15		Bringmann & Kühn, 1977b

Table II. 13: Toxicity of m-cresol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$]	result stand. soil [$mg/kg_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.5	1.6	-	23	14 d	NOEC	3.2	16	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.5	1.6	-	23	7 d	NOEC	3.2	16	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	96	480	a	Hulzebos et al., 1993

a growth

Table II. 14: Acute toxicity of p-cresol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	69		Schultz et al., 1986, 1987
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	165		Cronin & Schultz, 1996
bacteriophyta											
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	411		Nendza & Seydel, 1988
algae											
Scenedesmus subspicatus	N	S	-	8.0	54	am	48 h	EC50	7.8		Kühn & Pattard, 1990
crustacea											
Daphnia magna, 24 h	Y	R	-	8.0	48	am	24 h	EC50	4.9		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	24 h	EC50	14		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	48 h	EC50	7.7		Kühn et al., 1989
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	12.5		Devillers et al., 1987
Daphnia magna	-	S	rg	-	-	-	48 h	LC50	1.4		Parkhurst et al., 1979
Daphnia pulicaria	Y	F	-	8.1	707.3	nw	48 h	LC50	22.7		DeGraeve et al., 1980
pisces											
Oncorhynchus mykiss	Y	F	rg	-	-	dtw	96 h	LC50	7.5	α	Hodson et al., 1984
Oncorhynchus mykiss, 4.4 g	Y	F	-	8.1	707.3	nw	96 h	LC50	7.9		DeGraeve et al., 1980
Pimephales promelas	-	F	-	-	-	nw	96 h	LC50	16		Baerden & Schultz, 1997
Pimephales promelas, 2.0 g	Y	F	-	8.1	707.3	nw	96 h	LC50	28.6		DeGraeve et al., 1980

Table II. 15: Acute toxicity of p-cresol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	N	S	-	-	-	rw	5 min	EC50	1.5		Bulich et al., 1981
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	2.3		Ribo & Kaiser, 1983
Vibrio fisheri	N	S	-	-	-	am	15 min	EC50	2.3		Cronin & Schultz, 1997
Rhizobium meliloti	-	S	-	7.5	-	am	20 min	EC50	74		Botsford et al., 1997
echinodermata											
Strongylocentrotus droebachiensis, eggs	Y	S	98%	-	-	nw	96 h	EC50	5	a	Falk-Petersen et al., 1985
pisces											
Gadus morhua, 1-d-old embryos	Y	S	98%	-	-	nw	96 h	EC50	5	a	Falk-Petersen et al., 1985

a development

Table II. 16: Chronic toxicity p-cresol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna, 24 h	Y	R	-	8.0	48	am	21 d	NOEC	1.0		Kühn et al., 1989

Table II. 17: Acute toxicity of catechol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Pseudomonas fluorescens	-	S	≥99%	7.2	-	dtw	20 min	EC50	0.77		Boyd et al., 1997
Rhizobium meliloti	-	S	-	7.5	-	am	20 min	EC50	4		Botsford et al., 1997
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	19.5		Bryant & Schultz, 1994
pisces											
Oncorhynchus mykiss, 8.9 g	Y	F	-	8.1	707.3	nw	96 h	LC50	8.9		DeGraeve et al., 1980
Pimephales promelas, 0.9 g	Y	F	-	8.1	707.3	nw	96 h	LC50	3.5		DeGraeve et al., 1980

Table II. 18: Acute toxicity of catechol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min?	EC50	32		Boyd et al., 1997

Table II. 19: Toxicity of catechol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$]	result stand. soil [$mg/kg_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	> 1000	> 5000	a	Hulzebos et al., 1993

a growth

Table II. 20: Acute toxicity of resorcinol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	108		Devillers et al., 1987
Daphnia pulicaria	Y	F	-	8.1	707.3	nw	48 h	LC50	> 100		DeGraeve et al., 1980
pisces											
Oncorhynchus mykiss	Y	F	-	8.1	707.3	nw	96 h	LC50	> 100	a	DeGraeve et al., 1980
Pimephales promelas, 1.4 g	Y	F	-	8.1	707.3	nw	96 h	LC50	100		DeGraeve et al., 1980
Pimephales promelas	Y	R	-	7.2-7.9	40-48	rtw	96 h	LC50	60		Curtis & Ward, 1981
macrophyta											
Elodea canadensis	-	S	-	-	-	tap	9 d	EC50	143	b	Stom & Roth, 1981
Lemna minor	-	S	-	-	-	tap	12 d	EC50	165	b	Stom & Roth, 1981

a 20% mortality at 100 mg/l
b growth

Table II. 21: Acute toxicity of resorcinol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	110		Zhao & Wang, 1993
crustacea											
Palaemonetes pugio	Y	R	-	8.3-8.7	25	am	96 h	LC50	42		Curtis & Ward, 1981

Table II. 22: Chronic toxicity of resorcinol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
pisces											
Brachydanio rerio, eggs	N	S	≥99%	8.4	250	rw	7 d	NOEC	100	a	Van Leeuwen et al., 1990
Brachydanio rerio, eggs	N	S	≥99%	8.4	250	rw	7 d	NOEC	32	b	Van Leeuwen et al., 1990
Oncorhynchus mykiss, eggs	N	S	≥99%	7.7	50	rw	60 d	NOEC	100	ab	Van Leeuwen et al., 1990
Oncorhynchus mykiss, eggs	N	S	≥99%	7.7	50	rw	60 d	NOEC	1	c	Van Leeuwen et al., 1990

a mortality
b total embryotoxicity (lethality and malformations)
c weight

Table II. 23: Acute toxicity of hydroquinone to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Colpidium campylum	-	S	-	-	-	-	24 h	EC50	73.3		Devillers et al., 1990
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	37.1		Bryant & Schultz, 1994
rotifera											
Brachionus calyciflorus	N	S	ag	-	-	am	24 h	LC50	0.24		Crisinel et al., 1994
bacteriophyta											
Beneckea harveyi	-	S	-	7.5	-	am	10 sec	EC50	82.6	b	Devillers et al., 1990 (cited)
Beneckea harveyi	-	S	-	7.5	-	am	1 h	EC50	110	c	Devillers et al., 1990 (cited)
Escherichia coli	-	S	-	-	-	-	6-8 hr	EC50	34		Devillers et al., 1990
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	34		Nendza & Seydel, 1988
mycophyta											
Candida albicans	-	S	-	-	-	-	24 h	EC50	3750		Devillers et al., 1990
Saccharomyces cerevisiae	-	S	-	-	-	-	24 h	EC50	2750		Devillers et al., 1990
Torulopsis glabrata	-	S	-	-	-	-	24 h	EC50	1000		Devillers et al., 1990
algae											
Cryptecodinium cohnii	-	S	-	-	-	-	40 h	LC50	50		Devillers et al., 1990
Prorocentrum micans	-	S	-	-	-	-	2 h	EC50	0.3		Devillers et al., 1990
Selenastrum capricornutum	-	S	-	-	-	-	72 h	EC50	0.34		Devillers et al., 1990
crustacea											
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	24 h	EC50	0.32		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	48 h	EC50	0.29		Kühn et al., 1989
Daphnia magna, 24 h	N	S	-	7.6	272	am	24 h	LC50	0.09		Bringmann & Kühn, 1977a
Daphnia magna, 24 h	N	S	-	8	250	am	24 h	EC50	0.12		Bringmann & Kühn, 1982
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	0.14		Devillers et al., 1987
Daphnia magna	N	S	ag	7.8	250	am	48 h	EC50	0.13		Crisinel et al., 1994
Daphnia pulicaria	N	F	-	8.1	707.3	nw	48 h	LC50	0.162		DeGraeve et al., 1980
Streptocephalus rubricaudatus, cyst	N	S	ag	-	-	am	24 h	LC50	0.07		Crisinel et al., 1994
Streptocephalus texanus, cyst	N	S	ag	-	-	am	24 h	LC50	0.10		Crisinel et al., 1994
pisces											
Brachydanio rerio	N	S	-	7.5	-	-	96 h	LC50	0.17		Wellens, 1982

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Leuciscus idus melanotus	N	S	-	7-8	255	tap	48 h	LC50	0.15		Juhnke & Lüdemann, 1978
Oncorhynchus mykiss, 16.8 g	N	F	-	8.1	707.3	nw	96 h	LC50	0.097		DeGraeve et al., 1980
Oncorhynchus mykiss	Y	F	rg	-	-	dtw	96 h	LC50	0.64	α	Hodson et al., 1984
Pimephales promelas, 0.5 g	N	F	-	8.1	707.3	nw	96 h	LC50	0.044		DeGraeve et al., 1980
macrophyta											
Elodea canadensis	-	S	-	-	-	tap	9 d	EC50	43	a	Stom & Roth, 1981
Lemna minor	-	S	-	-	-	tap	12 d	EC50	7.7	a	Stom & Roth, 1981

a growth
b luminescence
c dehydrogenase activity

Table II. 24: Acute toxicity of hydroquinone to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	N	S	ag	-	-	am	15 min	EC50	0.31		Crisinel et al., 1994
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	0.038		Ribo & Kaiser, 1983
Vibrio fisheri	-	S	-	-	-	am	30 min	EC50	0.072		Devillers et al., 1990
crustacea											
Artemia salina, cysts	N	S	ag	-	35	rnw	24 h	LC50	30.7		Crisinel et al., 1994
Artemia salina	-	S	-	-	-	-	24 h	LC50	20.7		Devillers et al., 1990

Table II. 25: Chronic toxicity of hydroquinone to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Chilomonas paramaecium	N	S	-	6.9	142	am	48 h	NOEC	22		Bringmann et al., 1980
Entosiphon sulcatum	N	S	-	6.9	142	am	72 h	NOEC	11		Bringmann, 1978
Uronema parduczi	N	S	-	6.9	142	am	20 h	NOEC	21		Bringmann & Kühn, 1980b
bacteriophyta											
Pseudomonas putida	N	S	-	7.0	60	am	16 h	NOEC	58		Bringmann & Kühn, 1976
cyanophyta											
Microcystis aeruginosa	N	S	-	7.0	60	am	8 d	NOEC	1.1		Bringmann & Kühn, 1978a,b
algae											
Scenedesmus quadricauda	N	S	-	7.0	-	am	8 d	NOEC	0.93		Bringmann & Kühn, 1977b

Table II. 26: Toxicity of hydroquinone to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
macrophyta											
Hordeum vulgare	clay loam	6.9	4.6	28	20	7 d	NOEC	> 2500	> 5435	a	Bremner & Krogmeier, 1990
Hordeum vulgare	clay loam	7.5	5.6	30	20	7 d	NOEC	> 2500	> 4464	a	Bremner & Krogmeier, 1990
Hordeum vulgare	silty clay	7.7	11.2	42	20	7 d	NOEC	> 2500	> 2232	a	Bremner & Krogmeier, 1990
Medicago sativa	clay loam	6.9	4.6	28	20	7 d	NOEC	> 2500	> 5435	a	Bremner & Krogmeier, 1990
Medicago sativa	clay loam	7.5	5.6	30	20	7 d	NOEC	> 2500	> 4464	a	Bremner & Krogmeier, 1990
Medicago sativa	silty clay	7.7	11.2	42	20	7 d	NOEC	> 2500	> 2232	a	Bremner & Krogmeier, 1990
Sorghum bicolor	clay loam	6.9	4.6	28	20	7 d	NOEC	> 2500	> 5435	a	Bremner & Krogmeier, 1990
Sorghum bicolor	clay loam	7.5	5.6	30	20	7 d	NOEC	> 2500	> 4464	a	Bremner & Krogmeier, 1990
Sorghum bicolor	silty clay	7.7	11.2	42	20	7 d	NOEC	> 2500	> 2232	a	Bremner & Krogmeier, 1990
Triticum aestivum	clay loam	6.9	4.6	28	20	7 d	NOEC	500	1087	a	Bremner & Krogmeier, 1990
Triticum aestivum	clay loam	7.5	5.6	30	20	7 d	NOEC	500	893	a	Bremner & Krogmeier, 1990
Triticum aestivum	silty clay	7.7	11.2	42	20	7 d	NOEC	500	446	a	Bremner & Krogmeier, 1990
Zea mays	clay loam	6.9	4.6	28	20	7 d	NOEC	> 2500	> 5435	a	Bremner & Krogmeier, 1990
Zea mays	clay loam	7.5	5.6	30	20	7 d	NOEC	500	893	a	Bremner & Krogmeier, 1990
Zea mays	silty clay	7.7	11.2	42	20	7 d	NOEC	> 2500	> 2232	a	Bremner & Krogmeier, 1990

a seed germination

Appendix III Toxicity data on halogenated aromatic hydrocarbons

In this appendix toxicity data on halogenated aromatic hydrocarbons are presented.

Content

Table III. 1: Acute toxicity of 2-chlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	68		Bryant & Schultz, 1994
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	84		Cronin & Schultz, 1996
bacteriophyta											
Activated sludge bacteria-	-	S	-	7.5	-	am	6 h	IC50	372		Klecka & Landi, 1985
Activated sludge bacteria-	-	S	-	-	-	-	-	IC50	104	a	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	700	b	Liu et al., 1982
Salmonella typhimurium	-	S	-	7	-	am	30 min	EC50	412		Pill et al., 1991
Sirochaeta aurantia	-	S	-	7	-	am	30 min	EC50	167		Pill et al., 1991
algae											
Chlorella vulgaris	N	S	rg	7.5	-	am	96 h	EC50	170		Shigeoka et al., 1988
Pseudokirchneriella subcapitata	N	S	rg	7.5	-	am	96 h	EC50	70		Shigeoka et al., 1988
Scenedesmus subspicatus	N	S	-	8.0	54	am	48 h	EC50	50		Kühn & Pattard, 1990
crustacea											
Daphnia magna, 24 h	Y	R	-	8.0	48	am	24 h	EC50	6.3		Kühn et al., 1989
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	18		Devillers et al., 1987
Daphnia magna	-	S	-	-	-	-	48 h	EC50	23		Knie et al., 1983
Daphnia magna, =< 24 h	-	S	>=80%	8 (7.4-9.4)	160-186	rnw	48 h	LC50	2.6		LeBlanc, 1980
Daphnia magna,12-24 h	-	S	-	-	-	nw	48 h	EC50	3.9		Keen & Baillod, 1985
Daphnia magna, < 24 h	-	S	-	7.0-8.2	154.5	-	48 h	LC50	6.2		Randall & Knopp, 1980
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	15		Devillers & Chambon, 1986
Carassius auratus, 1-2 g	N	S	-	7.5	20	nw	96 h	LC50	12.4		Pickering & Henderson, 1966
Lepomis macrochirus, 0.32-1.2 g	-	S	>80%	6.5-7.9	32-48	nw	96 h	LC50	6.6		Buccafusco et al., 1981
Lepomis macrochirus, 1-2 g	-	S	-	7.5	20	nw	96 h	LC50	10		Pickering & Henderson, 1966
Pimephales promelas	N	F	-	-	-	-	96 h	LC50	14		Schultz et al., 1986
Pimephales promelas, 1-2 g	N	S	-	7.5	20	nw	96 h	LC50	11.6		Pickering & Henderson, 1966
Pimephales promelas, 1-2 g	N	S	-	8.2	360	nw	96 h	LC50	14.5		Pickering & Henderson, 1966
Pimephales promelas	Y	S	97%	7.8	42.6	nw	96 h	LC50	9.4		Geiger et al., 1988
Pimephales promelas, 30-35 d	-	F	-	7.2	43.3-48.5	nw	96 h	LC50	12		Phipps et al., 1981; Hall & Kier,

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
											1984; Hall et al., 1984
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	13		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	11		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	7		Könemann & Musch, 1981
Poecilia reticulata, 0.1-0.2 g	N	S	-	7.5	20	nw	96 h	LC50	20		Pickering & Henderson, 1966
Poecilia reticulata	-	S	pure	7	80-100	dtw	96 h	LC50	13.8		Saarikoski & Viluksela, 1981

a inhibition of phenol degradation
b dehydrogenase activity

Table III. 2: Acute toxicity of 2-chlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	9.3		Zhao & Wang, 1993
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	39.7		Ribo & Kaiser, 1983
crustacea											
Crangon septemspinosa, 2.4-4.5 g	N	S	-	-	30	nw	96 h	LC50	5.3		McLeese et al., 1979

Table III. 3: Chronic toxicity of 2-chlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna, 24 h	Y	R	-	8.0	48	am	21 d	NOEC	0.50		Kühn et al., 1989

Table III. 4: Toxicity of 2-chlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	43	215	a	Hulzebos et al., 1993

a growth

Table III. 5: Acute toxicity of 3-chlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	14.2		Bryant & Schultz, 1994
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	17.3		Bryant & Schultz, 1994
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	67	b	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	450	a	Liu et al., 1982
algae											
Pseudokirchneriella subcapitata	N	S	rg	7.5	-	am	96 h	EC50	29		Shigeoka et al., 1988
crustacea											
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	15.8		Devillers et al., 1987
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	15		Devillers & Chambon, 1986
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	8		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	6		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	6		Könemann & Musch, 1981

a dehydrogenase activity
b inhibition of phenol degradation

Table III. 6: Acute toxicity of 3-chlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	13.2		Ribo & Kaiser, 1983

Table III. 7: Toxicity of 3-chlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$]	result stand. soil [$mg/kg_{d.w.}$]	note	reference
annelida											
Eisenia andrei, adult	peat	3.8	15.6	9.0	23	14 d	LC50	423	271		Van Gestel & Ma, 1990
Eisenia andrei, adult	artificial soil	6.0	8.1	8.1	23	14 d	LC50	130	160		Van Gestel & Ma, 1990
Eisenia andrei, adult	sand	5.6	6.1	2.4	23	14 d	LC50	134	220		Van Gestel & Ma, 1990
Eisenia andrei, adult	sand	5.0	3.7	1.4	23	14 d	LC50	75	203		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	peat	3.8	15.6	9.0	23	14 d	LC50	633	406		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	artificial soil	6.0	8.1	8.1	23	14 d	LC50	247	305		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	sand	5.6	6.1	2.4	23	14 d	LC50	342	561		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	sand	5.0	3.7	1.4	23	14 d	LC50	150	405		Van Gestel & Ma, 1990
macrophyta											
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	7	35	a	Hulzebos et al., 1993

a growth

Table III. 8: Acute toxicity of 4-chlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	36.7		Bryant & Schultz, 1994
bacteriophyta											
Activated sludge bacteria	-	S	-	7.5	-	am	6 h	IC50	155		Klecka & Landi, 1985
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	71	a	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	400	b	Liu et al., 1982
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	131		Nendza & Seydel, 1988
algae											
Chlorella vulgaris	N	S	rg	7.5	-	am	96 h	EC50	29		Shigeoka et al., 1988
Pseudokirchneriella subcapitata	N	S	rg	7.5	-	am	96 h	EC50	38		Shigeoka et al., 1988
Pseudokirchneriella subcapitata	-	S	-	-	-	-	96 h	EC50	5.01		LeBlanc, 1984
Scenedesmus subspicatus	N	S	-	8.0	54	am	96 h	EC50	8		Kühn & Pattard, 1990
crustacea											
Ceriodaphnia dubia	-	S	-	8.2	90-110	nw	48 h	LC50	9		Cowgill & Milazzo, 1991
Daphnia magna, < 12 h	-	S	-	8.2	160-180	nw	48 h	LC50	6		Cowgill & Milazzo, 1991
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	24 h	EC50	3.4		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	48 h	EC50	2.5		Kühn et al., 1989
Daphnia magna, 24 h	Y	R	-	8.0	48	am	24 h	EC50	8.6		Kühn et al., 1989
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	8.1		Devillers et al., 1987
Daphnia magna, =< 24 h	-	S	>=80%	8 (7.4-9.4)	160-186	rnw	48 h	LC50	4.1		LeBlanc, 1980
macrophyta											
Lemna gibba	-	S	-	4.9	636	am	7 d	EC50	54-56	c	Cowgill et al., 1991
Lemna minor	-	S	-	4.9	636	am	7 d	EC50	25-41	c	Cowgill et al., 1991
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	8.7		Devillers & Chambon, 1986
Lepomis macrochirus, 0.32-1.2 g	-	S	>80%	6.5-7.9	32-48	nw	96 h	LC50	3.8		Buccafusco et al., 1981
Oncorhynchus mykiss	Y	F	rg	-	-	dtw	96 h	LC50	1.9	α	Hodson et al., 1984
Pimephales promelas	N	S	rg	7.9	96-125	nw	96 h	LC50	4.2	d	Mayes et al., 1983
Pimephales promelas	-	F	-	-	-	nw	96 h	LC50	6.2		Baerden & Schultz, 1997
Poecilia reticulata	-	S	pure	5	80-100	dtw	96 h	LC50	6.3		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	6	80-100	dtw	96 h	LC50	7.8		Saarikoski & Viluksela, 1981

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Poecilia reticulata	-	S	pure	7	80-100	dtw	96 h	LC50	8.5		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	8	80-100	dtw	96 h	LC50	9.0		Saarikoski & Viluksela, 1981

a inhibition of phenol degradation
b dehydrogenase activity
c results for number of plants, number of fronds and dry weight
d geometric mean of 96 h LC50-values found for fry, juvenile and subadults

Table III. 9: Acute toxicity of 4-chlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	4.3		Zhao & Wang, 1993
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	9.1		Ribo & Kaiser, 1983
algae											
Skeletonema costatum	-	S	-	-	-	-	96 h	EC50	3.3		LeBlanc, 1984
Skeletonema costatum	N	S	rg	8.2	-	am	120 h	EC50	13		Cowgill et al., 1989
annelida											
Platynereis dumerilii, embryos, < 6h post fertilization	N	S	> 90%	-	35	nw	48 h	EC50	23.6	a	Palau-Casellas & Hutchinson, 1998
Platynereis dumerilii, 7-d-old larvae	N	S	> 90%	-	35	nw	96 h	LC50	13.3		Palau-Casellas & Hutchinson, 1998
crustacea											
Crangon septemspinosa, 2.4-4.5 g	N	S	-	-	30	nw	96 h	LC50	4.6		McLeese et al., 1979
Mesidotea entomon	Y	F	-	7.7	6	nw	96 h	LC50	42, 28	b	Oksama & Kristofferson, 1979
Mysidopsis bahia	-	S	-	-	-	-	96 h	LC50	29.7		LeBlanc, 1984
pisces											
Cyprinodon variegatus, 8-15 mm	N	S	-	-	10-31	nw	96 h	LC50	5.4		Heitmuller et al., 1981

a normal embryo-larval development
b temperatures 5 and 10 °C, respectively

Table III. 10: Chronic toxicity of 4-chlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Ceriodaphnia dubia	-	S	-	8.2	90-110	nw	10 d	NOEC	0.2	a	Cowgill & Milazzo, 1991
Ceriodaphnia dubia	-	S	-	8.2	90-110	nw	10 d	NOEC	1.6	b, c, d	Cowgill & Milazzo, 1991
Daphnia magna, < 12 h	-	S	-	8.2	160-180	nw	12 d	NOEC	2.6	a, c	Cowgill & Milazzo, 1991
Daphnia magna, < 12 h	-	S	-	8.2	160-180	nw	12 d	NOEC	0.6	b	Cowgill & Milazzo, 1991
Daphnia magna, < 12 h	-	S	-	8.2	160-180	nw	12 d	NOEC	0.3	d	Cowgill & Milazzo, 1991
Daphnia magna, 24 h	Y	R	-	8.0	48	am	21 d	NOEC	0.63	a	Kühn et al., 1989

a mortality
b total progeny
c number of broods
d mean brood size

Table III. 11: Chronic toxicity of 4-chlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
algae											
Skeletonema costatum	N	S	rg	8.2	-	am	120 h	NOEC	1.08	a	Cowgill et al., 1989
Skeletonema costatum	N	S	rg	8.2	-	am	120 h	NOEC	0.39	b	Cowgill et al., 1989

a total cell count
b total cell volume

Table III. 12: Acute toxicity of 2,3-dichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	8.6		Cronin & Schultz, 1996
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	55	b	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	130	a	Liu et al., 1982
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	46		Nendza & Seydel, 1988
algae											
Pseudokirchneriella subcapitata	N	S	rg	7.5	-	am	96 h	EC50	5.0		Shigeoka et al., 1988
crustacea											
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	24 h	EC50	4.1		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	48 h	EC50	3.1		Kühn et al., 1989
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	5.2		Devillers et al., 1987
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	4.7		Devillers & Chambon, 1986

a dehydrogenase activity
b inhibition of phenol degradation

Table III. 13: Acute toxicity of 2,3-chlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	4.8		Ribo & Kaiser, 1983

Table III. 14: Acute toxicity of 2,4-dichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	15		Schultz et al., 1986, 1987
bacteriophyta											
Activated sludge bacteria	-	S	-	7.5	-	am	6 h	IC50	53		Klecka & Landi, 1985
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	47	a	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	75	b	Liu et al., 1982
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	54		Nendza & Seydel, 1988
Salmonella typhimurium	-	S	-	7	-	am	30 min	EC50	78		Pill et al., 1991
Sirochaeta aurantia	-	S	-	7	-	am	30 min	EC50	20		Pill et al., 1991
mycophyta											
Pichia sp.	-	S	-	-	-	am	12 h	EC50	43		German Chemical Society, 1988
Rhodotorula rubra	-	S	-	-	-	am	12 h	EC50	17		German Chemical Society, 1988
macrophyta											
Lemna minor	-	S	-	-	-	-	-	EC50	58	c	German Chemical Society, 1988
algae											
Chlorella vulgaris	N	S	rg	7.5	-	am	96 h	EC50	9.2		Shigeoka et al., 1988
Scenedesmus subspicatus	N	S	-	8.0	54	am	48 h	EC50	11.5		Kühn & Pattard, 1990
Selenastrum capricornutum	N	S	rg	7.5	-	am	96 h	EC50	14		Shigeoka et al., 1988
crustacea											
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	24 h	EC50	2.5		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	48 h	EC50	1.4		Kühn et al., 1989
Daphnia magna, 24 h	Y	R	-	8.0	48	am	24 h	EC50	3.9		Kühn et al., 1989
Daphnia magna, 24 h	N	S	-	7.6	272	am	24 h	LC50	11		Bringmann & Kühn, 1977a
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	2.7		Devillers et al., 1987
Daphnia magna, =< 24 h	-	S	>=80%	8 (7.4-9.4)	160-186	rnw	48 h	LC50	2.6		LeBlanc, 1980
pisces											
Brachydanio rerio	N	S	-	7.5	-	-	96 h	LC50	3.9		Wellens, 1982
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	4.8		Devillers & Chambon, 1986
Carassius auratus, 2 g	N	S	-	-	-	-	24 h	LC50	7.8		Kobayashi et al., 1979
Carassius auratus,2.5 g	Y	F	-	7.2	41-48	nw	96 h	LC50	23		Holcombe et al., 1987

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Lepomis macrochirus, 1.1 g	Y	F	-	7.2	41-48	nw	96 h	LC50	4		Holcombe et al., 1987
Lepomis macrochirus, 0.32-1.2 g	-	S	>80%	6.5-7.9	32-48	nw	96 h	LC50	2		Buccafusco et al., 1981
Leuciscus idus melanotus	N	S	-	7-8	255	tap	48 h	LC50	5		Juhnke & Lüdemann, 1978
Oncorhynchus mykiss	Y	F	rg	7.9	135	dtw	96 h	LC50	2.6	α	Hodson et al., 1984
Oncorhynchus mykiss, 13.1 g	Y	F	-	7.2	41-48	nw	96 h	LC50	1.16		Holcombe et al., 1987
Pimephales promelas, 30-35 d	N	F	-			nw		LC50	8.2		Hall & Kier, 1984; Hall et al., 1984; Phipps et al., 1981
Pimephales promelas, 0.3 g	Y	F	-	7.2	41-48	nw	96 h	LC50	8.39		Holcombe et al., 1987
Pimephales promelas	N	F	-	-	-	-	96 h	LC50	7.7		Schultz et al., 1986
Pimephales promelas	Y	S	97%	7.4	45.2	nw	96 h	LC50	7.8		Geiger et al., 1985
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	5.9		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	4.2		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	3.3		Könemann & Musch, 1981
Poecilia reticulata	-	S	pure	6	80-100	dtw	96 h	LC50	3.5		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	7	80-100	dtw	96 h	LC50	5.5		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	8	80-100	dtw	96 h	LC50	7.6		Saarikoski & Viluksela, 1981

a inhibition of phenol degradation
b dehydrogenase activity
c reduction in chlorophyl content

Table III. 15: Acute toxicity of 2,4-dichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	5.8		Zhao & Wang, 1993
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	5.0		Ribo & Kaiser, 1983

Table III. 16: Chronic toxicity of 2,4-dichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Chilomonas paramaecium	N	S	-	6.9	142	am	48 h	NOEC	5.8		Bringmann et al., 1980
Entosiphon sulcatum	N	S	-	6.9	142	am	72 h	NOEC	0.50		Bringmann, 1978
Uronema parduczi	N	S	-	6.9	142	am	20 h	NOEC	1.6		Bringmann & Kühn, 1980b
bacteriophyta											
Pseudomonas putida	N	S	-	7.0	60	am	16 h	NOEC	6		Bringmann & Kühn, 1976
cyanophyta											
Microcystis aeruginosa	N	S	-	7.0	60	am	8 d	NOEC	2		Bringmann & Kühn, 1978a,b
Scenedesmus quadricauda	N	S	-	7.0	-	am	8 d	NOEC	3.6		Bringmann & Kühn, 1977b
crustacea											
Daphnia magna, 24 h	Y	R	-	8.0	48	am	21 d	NOEC	0.32		Kühn et al., 1989
Daphnia magna	Y	S	99.9%	-	170	nw	21 d	NOEC	0.74	a	Gersich & Milazzo, 1988
Daphnia magna	Y	S	99.9%	-	170	nw	21 d	NOEC	1.48	b	Gersich & Milazzo, 1988
Daphnia magna	Y	S	99.9%	-	170	nw	21 d	NOEC	0.74	c	Gersich & Milazzo, 1988

a mortality
b growth
c reproduction

Table III. 17: Chronic toxicity of 2,4-dichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
phaeophyta (macrophyta)											
Phyllospora comosa, 1-d-old zygote	-	S	99%	7	34	nw	96 h	NOEC	< 10 E-6	a	Burridge et al., 1995
Phyllospora comosa, 7-d-old embryo	-	S	99%	7	34	nw	96 h	NOEC	10 E-4	a	Burridge et al., 1995
crustacea											
Allorchestes compressa, 7 mm	-	S	99%	8	34	nw	96 h	NOEC	0.075	a	Burridge et al., 1995
Allorchestes compressa, 10 mm	-	S	99%	8	34	nw	96 h	NOEC	0.05	a	Burridge et al., 1995
Allorchestes compressa, 12 mm	-	S	99%	8	34	nw	96 h	NOEC	0.075	a	Burridge et al., 1995

a mortality

Table III. 18: Toxicity of 2,4-dichlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	53	265	a	Hulzebos et al., 1993

a growth

Table III. 19: Acute toxicity of 2,5-dichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	12		Cronin & Schultz, 1996
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	50 a		Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	85 b		Liu et al., 1982
crustacea											
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	4.9		Devillers et al., 1987
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	3.1		Devillers & Chambon, 1986

a inhibition of phenol degradation
b dehydrogenase activity

Table III. 20: Acute toxicity of 2,5-dichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	9.6		Ribo & Kaiser, 1983

Table III. 21: Acute toxicity of 2,6-dichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena thermophila	-	S	-	7.4	-	am	48 h	EC50	26		Pauli et al., 1993
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	30		Cronin & Schultz, 1996
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	65	a	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	550	b	Liu et al., 1982
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	117		Nendza & Seydel, 1988
algae											
Chlorella vulgaris	N	S	rg	7.5	-	am	96 h	EC50	9.7		Shigeoka et al., 1988
Selenastrum capricornutum	N	S	rg	7.5	-	am	96 h	EC50	29		Shigeoka et al., 1988
crustacea											
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	24 h	EC50	6.0		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	48 h	EC50	3.4		Kühn et al., 1989
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	9.4		Devillers et al., 1987
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	7.3		Devillers & Chambon, 1986
Poecilia reticulata	-	S	pure	6	80-100	dtw	96 h	LC50	3.9		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	7	80-100	dtw	96 h	LC50	7.8		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	8	80-100	dtw	96 h	LC50	17.9		Saarikoski & Viluksela, 1981

a inhibition of phenol degradation
b dehydrogenase activity

Table III. 22: Acute toxicity of 2,6-dichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	13.6		Ribo & Kaiser, 1983
crustacea											
Crangon septemspinosa, 2.4-4.5 g	N	S	-	-	30	nw	52 h	LC50	19.1		McLeese et al., 1979

Table III. 23: Chronic toxicity of 2,6-dichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena thermophila	-	S	-	7.4	-	am	48 h	NOEC	20		Pauli et al., 1993

Table III. 24: Acute toxicity of 3,4-dichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	3.0		Bryant & Schultz, 1994
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	43	a	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	52	b	Liu et al., 1982
algae											
Selenastrum capricornutum	N	S	rg	7.5	-	am	96 h	EC50	3.2		Shigeoka et al., 1988
crustacea											
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	2.8		Devillers et al., 1987
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	1.7		Devillers & Chambon, 1986

a inhibition of phenol degradation
b dehydrogenase activity

Table III. 25: Acute toxicity of 3,4-dichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	9.3		Zhao & Wang, 1993
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	1.7		Ribo & Kaiser, 1983
crustacea											
Crangon septemspinosa, 2.4-4.5 g	N	S	-	-	30	nw	96 h	LC50	5.3		McLeese et al., 1979

Table III. 26: Toxicity of 3,4-dichlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
annelida											
Eisenia andrei, adult	peat	3.8	15.6	9.0	23	14 d	LC50	423	271		Van Gestel & Ma, 1990
Eisenia andrei, adult	artificial soil	6.0	8.1	8.1	23	14 d	LC50	172	212		Van Gestel & Ma, 1990
Eisenia andrei, adult	sand	5.6	6.1	2.4	23	14 d	LC50	240	393		Van Gestel & Ma, 1990
Eisenia andrei, adult	sand	5.0	3.7	1.4	23	14 d	LC50	134	362		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	peat	3.8	15.6	9.0	23	14 d	LC50	680	436		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	artificial soil	6.0	8.1	8.1	23	14 d	LC50	322	398		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	sand	5.6	6.1	2.4	23	14 d	LC50	486	797		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	sand	5.0	3.7	1.4	23	14 d	LC50	352	951		Van Gestel & Ma, 1990

Table III. 27: Acute toxicity of 3,5-dichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	4.5		Bryant & Schultz, 1994
bacteriophyta											
Activated sludge bacteria	-	S	-	7.5	-	am	6 h	IC50	12	a	Klecka & Landi, 1985
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	58	b	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	25	c	Liu et al., 1982
algae											
Selenastrum capricornutum	N	S	rg	7.5	-	am	96 h	EC50	2.3		Shigeoka et al., 1988
crustacea											
Daphnia magna, 24 h	N	S	-	8	250	am	24 h	LC50	2.8		Bringmann & Kühn, 1982
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	2.1		Devillers et al., 1987
Streptocephalus proboscideus	N	S	ag	-	-	am	24 h	LC50	4.13		Crisinel et al., 1994
Streptocephalus rubricaudatus, cyst	N	S	ag	-	-	am	24 h	LC50	4.19		Crisinel et al., 1994
Streptocephalus texanus, cyst	N	S	ag	-	-	am	24 h	LC50	4.18		Crisinel et al., 1994
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	1.7		Devillers & Chambon, 1986
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	4.7		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	2.7		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	2.6		Könemann & Musch, 1981

a respiration inhibition
b inhibition of phenol degradation
c dehydrogenase activity

Table III. 28: Acute toxicity of 3,5-dichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	3.2		Ribo & Kaiser, 1983
crustacea											
Artemia salina, cysts	N	S	ag	-	35 o/oo	rnw	24 h	LC50	8.9		Crisinel et al., 1994
Crangon septemspinosa, 2.4-4.5 g	N	S	-	-	30 o/oo	nw	96 h	LC50	1.5		McLeese et al., 1979
annelida											
Platynereis dumerilii, embryos, < 6h post fertilization	N	S	> 90%	-	35o/oo	nw	48 h	EC50	4.24	a	Palau-Casellas & Hutchinson, 1998
Platynereis dumerilii, 7-d-old larvae	N	S	> 90%	-	35o/oo	nw	96 h	LC50	1.94		Palau-Casellas & Hutchinson, 1998

a normal embryonal development

Table III. 29: Toxicity of 3,5-dichlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$]	result stand. soil [$mg/kg_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	32	160	a	Hulzebos et al., 1993

a growth

Table III. 30: Acute toxicity of trichlorophenol (not specified) to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Rhizobium meliloti	-	S	-	7.5	-	am	20 min	EC50	4		Botsford et al., 1997

Table III. 31: Acute toxicity of 2,3,4-trichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	27	a	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	13	b	Liu et al., 1982
algae											
Selenastrum capricornutum	N	S	rg	7.5	-	am	96 h	EC50	2.0		Shigeoka et al., 1988
crustacea											
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	2.2		Devillers et al., 1987
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	1.9		Devillers & Chambon, 1986

a inhibition of phenol degradation
b dehydrogenase activity

Table III. 32: Acute toxicity of 2,3,4-trichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	1.6		Ribo & Kaiser, 1983
crustacea											
Crangon septemspinosa, 2.4-4.5 g	N	S	-	-	30 o/oo	nw	96 h	LC50	2.0		McLeese et al., 1979

Table III. 33: Acute toxicity of 2,3,5-trichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	0.84		Bryant & Schultz, 1994
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	22	a	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	10	b	Liu et al., 1982
crustacea											
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	2.3		Devillers et al., 1987
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	1.4		Devillers & Chambon, 1986
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	4.7		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	1.6		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	0.9		Könemann & Musch, 1981

a inhibition of phenol degradation
b dehydrogenase activity

Table III. 34: Acute toxicity of 2,3,5-trichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	1.4		Ribo & Kaiser, 1983

Table III. 35: Toxicity of 2,3,5-trichlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$]	result stand. soil [$mg/kg_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.5	1.6	-	23	14d	NOEC	3.2	16	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.5	1.6	-	23	7 d	NOEC	1	5	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	9	45	a	Hulzebos et al., 1993

a growth

Table III. 36: Acute toxicity of 2,3,6-trichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	39	a	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	190	b	Liu et al., 1982
crustacea											
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	7.4		Devillers et al., 1987
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	7.5		Devillers & Chambon, 1986
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	13.4		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	5.1		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	0.9		Könemann & Musch, 1981

a inhibition of phenol degradation
b dehydrogenase activity

Table III. 37: Acute toxicity of 2,3,6-trichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	13.3		Ribo & Kaiser, 1983
crustacea											
Crangon septemspinosa, 2.4-4.5 g	N	S	-	-	30 o/oo	nw	96 h	LC50	2.7		McLeese et al., 1979

Table III. 38: Acute toxicity of 2,4,5-trichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	1.6		Bryant & Schultz, 1994
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	24	b	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	12	a	Liu et al., 1982
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	8.3		Nendza & Seydel, 1988
crustacea											
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	24 h	EC50	1.59		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	48 h	EC50	0.9		Kühn et al., 1989
Daphnia magna, 24 h	N	S	-	8	250	am	24 h	EC50	1.3		Bringmann & Kühn, 1982
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	2.1		Devillers et al., 1987
Daphnia magna	-	S	-	-	-	-	48 h	EC50	1.2		Knie et al., 1983
Daphnia magna, =< 24 h	-	S	>=80%	8 (7.4-9.4)	160-186	rnw	48 h	LC50	2.7		LeBlanc, 1980
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	1.3		Devillers & Chambon, 1986
Lepomis macrochirus, 0.32-1.2 g	-	S	>80%	6.5-7.9	32-48	nw	96 h	LC50	0.45		Buccafusco et al., 1981
Leuciscus idus	-	S	-	-	-	-	96 h	LC50	1		Knie et al., 1983
Pimephales promelas	N	R	99.5	-	44-49	nw	96 h	LC50	0.9		Norberg-King, 1989
Poecilia reticulata	-	S	pure	6	80-100	dtw	96 h	LC50	0.99		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	7	80-100	dtw	96 h	LC50	1.2		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	8	80-100	dtw	96 h	LC50	3.1		Saarikoski & Viluksela, 1981

a dehydrogenase activity
b inhibition of phenol degradation

Table III. 39: Acute toxicity of 2,4,5-trichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	1.2		Ribo & Kaiser, 1983
algae											
Skeletonema costatum	-	S	-	-	-	-	96 h	EC50	0.99		LeBlanc, 1984
annelida											
Platynereis dumerilii, embryos, < 6h post fertilization	N	S	> 90%	-	35o/oo	nw	48 h	EC50	2.55	a	Palau-Casellas & Hutchinson, 1998
Platynereis dumerilii, 7-d-old larvae	N	S	> 90%	-	35o/oo	nw	96 h	LC50	4.24		Palau-Casellas & Hutchinson, 1998
crustacea											
Mysidopsis bahia								LC50	3.8		LeBlanc, 1984
pisces											
Cyprinodon variegatus, 8-15 mm	N	S	-	-	10-31o/oo	nw	96 h	LC50	1.7		Heitmuller et al., 1981

a normal embryonal development

Table III. 40: Chronic toxicity of 2,4,5-trichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
pisces											
Pimephales promelas, larvae	N	R	99.5%	-	44-49	nw	7 d	NOEC	0.36	a, b	Norberg-King, 1989

a mortality
b growth

Table III. 41: Toxicity of 2,4,5-trichlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
annelida											
Eisenia andrei, adult	peat	3.8	15.6	9.0	23	14 d	LC50	164	105		Van Gestel & Ma, 1990
Eisenia andrei, adult	artificial soil	6.0	8.1	8.1	23	14 d	LC50	63	78		Van Gestel & Ma, 1990
Eisenia andrei, adult	sand	5.6	6.1	2.4	23	14 d	LC50	76	125		Van Gestel & Ma, 1990
Eisenia andrei, adult	sand	5.0	3.7	1.4	23	14 d	LC50	46	124		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	peat	3.8	15.6	9.0	23	14 d	LC50	875	561		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	artificial soil	6.0	8.1	8.1	23	14 d	LC50	362	447		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	sand	5.6	6.1	2.4	23	14 d	LC50	316	518		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	sand	5.0	3.7	1.4	23	14 d	LC50	235	635		Van Gestel & Ma, 1990

Table III. 42: Acute toxicity of 2,4,6-trichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	4.0		Schultz et al., 1986, 1987
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	7.7		Cronin & Schultz, 1996
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	42	b	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	240	a	Liu et al., 1982
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	38		Nendza & Seydel, 1988
Sirochaeta aurantia	-	S	-	7	-	am	30 min	EC50	43		Pill et al., 1991
algae											
Chlorella vulgaris	N	S	rg	7.5	-	am	96 h	EC50	10.0		Shigeoka et al., 1988
Scenedesmus subspicatus	-	S	98%	7	-	am	96 h	EC50	5.6		Geyer et al., 1985
Selenastrum capricornutum	N	S	rg	7.5	-	am	96 h	EC50	3.5		Shigeoka et al., 1988
crustacea											
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	24 h	EC50	3.7		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	48 h	EC50	2.2		Kühn et al., 1989
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	5.5		Devillers et al., 1987
Daphnia magna, =< 24 h	-	S	>=80%	8 (7.4-9.4)	160-186	rnw	48 h	LC50	6		LeBlanc, 1980
Daphnia magna, < 24 h	N	S	> 95%	6.5	-	am	48 h	LC50	0.69		Oikari et al, 1992
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	2.5		Devillers & Chambon, 1986
Jordanella floridae	Y	F	-	6.6-7.3	46-50	dtw	96 h	LC50	2.2	α	Smith et al., 1991
Lepomis macrochirus, 1.1 g	Y	F	-	7.2	41-48	nw	96 h	LC50	0.41		Holcombe et al., 1987
Lepomis macrochirus, 0.32-1.2 g	-	S	>80%	6.5-7.9	32-48	nw	96 h	LC50	0.32		Buccafusco et al., 1981
Oncorhynchus mykiss, 13.1 g	Y	F	-	7.2	41-48	nw	96 h	LC50	0.73		Holcombe et al., 1987
Pimephales promelas, 30-35 d	N	F	-			nw		LC50	9.2		Phipps et al., 1981; Hall & Kier, 1984; Hall et al., 1984
Pimephales promelas, 0.3 g	Y	F	-	7.2	41-48	nw	96 h	LC50	2.74		Holcombe et al., 1987
Pimephales promelas	N	F	-	-	-	-	96 h	LC50	9.2		Schultz et al., 1986
Pimephales promelas	-	F	-	-	-	nw	96 h	LC50	4.9		Baerden & Schultz, 1997
Poecilia reticulata	-	S	pure	5	80-100	dtw	96 h	LC50	0.61		Saarikoski & Viluksela, 1981

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Poecilia reticulata	-	S	pure	6	80-100	dtw	96 h	LC50	0.89		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	7	80-100	dtw	96 h	LC50	2.3		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	8	80-100	dtw	96 h	LC50	7.9		Saarikoski & Viluksela, 1981

a dehydrogenase activity
b inhibition of phenol degradation

Table III. 43: Acute toxicity of 2,4,6-trichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	8.2		Ribo & Kaiser, 1983

Table III. 44: Chronic toxicity of 2,4,6-trichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
pisces											
Jordanella floridae, < 24 h eggs	Y	F	-	6.6-7.3	46-50	dnw	15 d	NOEC	0.42	a	Smith et al., 1991
Jordanella floridae, 7 d fry	Y	F	-	6.6-7.3	46-50	dnw	28 d	NOEC	1.01	a	Smith et al., 1991
Jordanella floridae, 7 d fry	Y	F	-	6.6-7.3	46-50	dnw	28 d	NOEC	0.18	b	Smith et al., 1991

a mortality
b growth

Table III. 45: Toxicity of 2,4,6-trichlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
annelida											
Eisenia fetida	artificial soil	6.0	10	20	20	14 d	LC50	58	58		Denneman & Van Gestel, 1990
Allolobophora tuberculata	artificial soil	6.0	10	20	20	14 d	LC50	108	108		Denneman & Van Gestel, 1990
Eudrilus eugeniae	artificial soil	6.0	10	20	20	14 d	LC50	85	85		Denneman & Van Gestel, 1990
Perionyx excavatus	artificial soil	6.0	10	20	20	14 d	LC50	78	78		Denneman & Van Gestel, 1990
macrophyta											
Avena sativa	humic sand	5.1	3.7	-	25	14 d	NOEC	100	270	a	Adema & Henzen, 1989
Avena sativa	loam	7.5	1.4	-	25	14 d	NOEC	100	500	a	Adema & Henzen, 1989
Lactuca sativa	humic sand	5.1	3.7	-	25	14 d	NOEC	32	86	a	Adema & Henzen, 1989
Lactuca sativa	loam	7.5	1.4	-	25	14 d	NOEC	32	160	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	16	80	a	Hulzebos et al., 1993
Lycopersicum esculentum	humic sand	5.1	3.7	-	25	14 d	NOEC	100	270	a	Adema & Henzen, 1989
Lycopersicum esculentum	loam	7.5	1.4	-	25	14 d	NOEC	100	500	a	Adema & Henzen, 1989

a growth

Table III. 46: Acute toxicity of 3,4,5-trichlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	20	b	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	5	a	Liu et al., 1982
crustacea											
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	0.9		Devillers et al., 1987
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	1.0		Devillers & Chambon, 1986
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	2.4		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	1.1		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	1.1		Könemann & Musch, 1981

a dehydrogenase activity
b inhibition of phenol degradation

Table III. 47: Acute toxicity of 3,4,5-trichlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	0.38		Ribo & Kaiser, 1983

Table III. 48: Acute toxicity of 2,3,4,5-tetrachlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	0.45		Bryant & Schultz, 1994
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	20	b	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	4	a	Liu et al., 1982
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	10		Nendza & Seydel, 1988
crustacea											
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	1.8		Devillers et al., 1987
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	0.88		Devillers & Chambon, 1986
Pimephales promelas, 30-35 d	N	F	-			nw		LC50	0.44		Hall & Kier, 1984; Hall et al., 1984
Pimephales promelas	N	F	-	-	-	-	96 h	LC50	0.4		Schultz et al., 1986
Pimephales promelas	Y	S	97%	7.3	45.1	nw	96 h	LC50	0.41		Geiger et al., 1985
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	2.3		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	0.8		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	0.4		Könemann & Musch, 1981

a dehydrogenase activity
b inhibition of phenol degradation

Table III. 49: Acute toxicity of 2,3,4,5-tetrachlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	0.21		Ribo & Kaiser, 1983

Table III. 50: Toxicity of 2,3,4,5-tetrachlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$]	result stand. soil [$mg/kg_{d.w.}$]	note	reference
annelida											
Eisenia andrei, adult	sand	5.6	6.1	2.4	23	14 d	LC50	166	272		Van Gestel & Ma, 1990
Eisenia andrei, adult	sand	5.0	3.7	1.4	23	14 d	LC50	117	316		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	sand	5.6	6.1	2.4	23	14 d	LC50	875	1434		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	sand	5.0	3.7	1.4	23	14 d	LC50	515	1392		Van Gestel & Ma, 1990

Table III. 51: Acute toxicity of 2,3,4,6-tetrachlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	40	a	Beltrame et al., 1984
protozoa											
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	1.4		Baerden & Schultz, 1997
rotifera											
Brachionus calyciflorus	N	S	95%	7.9	374	nw	24 h	LC50	5.19	b	Liber & Solomon, 1994
Brachionus calyciflorus	N	S	95%	-	-	nw	24 h	LC50	5.19	c	Liber & Solomon, 1994
Keratella cochlearis	N	S	95%	7.9	374	nw	12 h	LC50	0.96		Liber & Solomon, 1994
algae											
Chlorella vulgaris	N	S	rg	7.5	-	am	96 h	EC50	10.1		Shigeoka et al., 1988
Selenastrum capricornutum	N	S	rg	7.5	-	am	96 h	EC50	1.3		Shigeoka et al., 1988
crustacea											
Daphnia galeata mendotae	N	S	95%	7.9	374	nw	48 h	LC50	0.58		Liber & Solomon, 1994
Daphnia magna	N	S	95%	7.9	374	nw	48 h	LC50	2.66		Liber & Solomon, 1994
Daphnia magna, =< 24 h	-	S	>=80%	8 (7.4-9.4)	160-186	rnw	48 h	LC50	0.29		LeBlanc, 1980
Daphnia magna, < 24 h	N	S	> 95%	6.5	-	am	48 h	LC50	0.18		Oikari et al, 1992
pisces											
Lepomis macrochirus, 0.32-1.2 g	-	S	>80%	6.5-7.9	32-48	nw	96 h	LC50	0.14		Buccafusco et al., 1981
Pimephales promelas	-	F	-	-	-	nw	96 h	LC50	1.04		Baerden & Schultz, 1997
Poecilia reticulata	-	S	pure	6	80-100	dtw	96 h	LC50	0.34		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	7	80-100	dtw	96 h	LC50	1.1		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	8	80-100	dtw	96 h	LC50	3.7		Saarikoski & Viluksela, 1981

a inhibition of phenol degradation
b 100% well water
c 33% well water and 67% distilled water

Table III. 52: Acute toxicity of 2,3,4,6-tetrachlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	1.5		Ribo & Kaiser, 1983
crustacea											
Crangon septemspinosa, 2.4-4.5 g	N	S	-	-	30 o/oo	nw	96 h	LC50	11.8		McLeese et al., 1979

Table III. 53: Acute toxicity of 2,3,5,6-tetrachlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	1.4		Bryant & Schultz, 1994
bacteriophyta											
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	44	a	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	54	b	Liu et al., 1982
crustacea											
Daphnia magna, < 72 h	-	S	> 95%	8	200	rw	24 h	EC50	2.3		Devillers et al., 1987
Daphnia magna, =< 24 h	-	S	>=80%	8 (7.4-9.4)	160-186	rnw	48 h	LC50	0.57		LeBlanc, 1980
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	3.6		Devillers & Chambon, 1986
Jordanella floridae	Y	F	-	6.6-7.3	46-50	dtw	96 h	LC50	1.16	α	Smith et al., 1991
Lepomis macrochirus, 0.32-1.2 g	-	S	>80%	6.5-7.9	32-48	nw	96 h	LC50	0.17		Buccafusco et al., 1981
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	3.9		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	1.4		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	0.4		Könemann & Musch, 1981

a inhibition of phenol degradation
b dehydrogenase activity

Table III. 54: Acute toxicity of 2,3,5,6-tetrachlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	2.5		Ribo & Kaiser, 1983
pisces											
Cyprinodon variegatus, 8-15 mm	N	S	-	-	10-31o/oo	nw	96 h	LC50	1.9		Heitmuller et al., 1981

Table III. 55: Chronic toxicity of 2,3,5,6-tetrachlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
pisces											
Jordanella floridae, < 24 h eggs	Y	F	-	6.6-7.3	46-50	dnw	15 d	NOEC	0.21	a	Smith et al., 1991
Jordanella floridae, < 24 h eggs	Y	F	-	6.6-7.3	46-50	dnw	5 d	NOEC	0.57	b	Smith et al., 1991
Jordanella floridae, 7 d fry	Y	F	-	6.6-7.3	46-50	dnw	28 d	NOEC	0.095	a	Smith et al., 1991

a mortality
b hatchability

Table III. 56: Acute toxicity of pentachlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	-	S	>95%	7.35	-	am	48 h	EC50	0.80		Bryant & Schultz, 1994
Tetrahymena pyriformis	-	S	-	-	-	am	48 h	EC50	2.4		Cronin & Schultz, 1996
Tetrahymena pyriformis	N	S	ag	-	-	am	48 h	EC50	0.25		Schäfer et al., 1994
Tetrahymena pyriformis	N	S	ag	-	-	am	48 h	EC50	0.64		Schäfer et al., 1994
rotifera											
Brachionus calyciflorus	N	S	ag	-	-	am	24 h	LC50	1.41		Crisinel et al., 1994
Brachionus calyciflorus, cysts	N	S	ag	7.8	90	am	24 h	LC50	1.2		Ferrando et al., 1992
Brachionus calyciflorus, cysts	N	S	ag	7.8	90	am	5 h	EC50	1.85		Ferrando et al., 1992
Brachionus calyciflorus, neonate	N	S	99%	7.9	374	nw	24 h	LC50	2.66	d	Liber & Solomon, 1994
Brachionus calyciflorus, neonate	N	S	99%	7.9	374	nw	24 h	LC50	7.76	d	Liber & Solomon, 1994
Brachionus calyciflorus, adult	N	S	99%	7.9	374	nw	24 h	LC50	2.09	d	Liber & Solomon, 1994
Brachionus calyciflorus, adult	N	S	99%	7.9	374	nw	24 h	LC50	3.34	d	Liber & Solomon, 1994
bacteriophyta											
Activated sludge bacteria	-	S	-	7.5	-	am	6 h	IC50	2.5		Klecka & Landi, 1985
Activated sludge bacteria	-	S	-	-	-	-	-	IC50	23	e	Beltrame et al., 1984
Bacillus sp.	-	S	-	7	-	am	30 min	EC50	9	c	Liu et al., 1982
Rhizobium meliloti	-	S	-	7.5	-	am	20 min	EC50	0.4		Botsford et al., 1997
Escherichia coli	-	S	-	-	-	am	12-16 h	EC50	32		Nendza & Seydel, 1988
Salmonella typhimurium	-	S	-	7	-	am	30 min	EC50	2.7		Pill et al., 1991
Sirochaeta aurantia	-	S	-	7	-	am	30 min	EC50	2.5		Pill et al., 1991
algae											
Chlamydomonas reinhardi	N	S	ag	-	-	am	72 h	EC50	0.22		Schäfer et al., 1994
Chlorella pyrenoidosa	Y	S	pure	8	-	am	96 h	EC50	7.0		Adema & Vink, 1981
Chlorella vulgaris	N	S	rg	7.5	-	am	96 h	EC50	10.3		Shigeoka et al., 1988
Scenedesmus quadricauda	Y	S	pure	8	-	am	96 h	EC50	0.08		Adema & Vink, 1981
Scenedesmus subspicatus	-	S	99%	7	-	am	96 h	EC50	0.09		Geyer et al., 1985
Scenedesmus subspicatus	N	S	ag	-	-	am	72 h	EC50	0.183		Schäfer et al., 1994
Selenastrum capricornutum	N	S	rg	7.5	-	am	96 h	EC50	0.42		Shigeoka et al., 1988

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
annelida											
Dugesia cf. lugubris	N	S	>98%	8.2	200	am	48 h	LC50	0.13		Slooff, 1983
Erpobdella octoculata	N	S	>98%	8.2	200	am	48 h	LC50	0.25		Slooff, 1983
Lumbriculus variegatus	N	S	-	7.6	10	nw	96 h	EC50	0.69		Hickey & Martin, 1995
Tubificidae	N	S	>98%	8.2	200	am	48 h	LC50	1.0		Slooff, 1983
insecta											
Chironomus gr. thummi	N	S	>98%	8.2	200	am	48 h	LC50	0.11		Slooff, 1983
Cloëon dipterum	N	S	>98%	8.2	200	am	48 h	LC50	5.9		Slooff, 1983
Corixa punctata	N	S	>98%	8.2	200	am	48 h	LC50	11		Slooff, 1983
Ischnura elegans	N	S	>98%	8.2	200	am	48 h	LC50	42		Slooff, 1983
Nemoura cinerea	N	S	>98%	8.2	200	am	48 h	LC50	0.38		Slooff, 1983
crustacea											
Asellus aquaticus	N	S	>98%	8.2	200	am	48 h	LC50	2.9		Slooff, 1983
Chaetocorophium c.f. lucasi	N	S	-	7.6	10	nw	96 h	EC50	0.13		Hickey & Martin, 1995
Cypris subglobosa, 0.67 mm	-	S	rg	7.9	204	dtw	96 h	LC50	6.6		Rao et al., 1983
Daphnia magna, < 24 h	-	S	rg	7.6	-	am	24 h	EC50	0.86		Lilius et al., 1994
Daphnia cucullata, 11 d	N	S	≥98%	7.9	100	am	48 h	LC50	1.5		Canton & Adema, 1978
Daphnia magna, < 1 d	N	S	≥98%	7.9	100	am	48 h	LC50	0.25	b	Canton & Adema, 1978
Daphnia magna, < 1 d	N	S	≥98%	7.9	100	am	48 h	LC50	0.40	b	Canton & Adema, 1978
Daphnia magna, < 1 d	N	S	≥98%	7.9	100	am	48 h	LC50	0.80	b	Canton & Adema, 1978
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	24 h	EC50	0.67		Kühn et al., 1989
Daphnia magna, 6-24 h	N	S	-	8.0	240	am	48 h	EC50	0.55		Kühn et al., 1989
Daphnia magna, larvae, 1mm	Y	S	pure	8	-	hard	48 h	LC50	1.05		Adema & Vink, 1981
Daphnia magna, adult 3 mm	Y	S	pure	8	-	hard	48 h	LC50	1.40		Adema & Vink, 1981
Daphnia magna, < 24 h	-	S	-	7.0-8.2	154.5	-	48 h	LC50	0.95		Randall & Knopp, 1980
Daphnia magna, 24 h	N	S	-	8	250	am	24 h	LC50	0.8		Bringmann & Kühn, 1982
Daphnia magna, < 72 h	-	S	>95%	8	200	rw	24 h	EC50	0.75		Devillers et al., 1987
Daphnia magna, =< 24 h	-	S	≥80%	8 (7.4-9.4)	160-186	rnw	48 h	LC50	0.68		LeBlanc, 1980
Daphnia magna, < 24 h	-	S	ag	7.8-8.2	250	rhw	48 h	EC50	0.37		Berglind & Dave, 1984
Daphnia magna, < 24 h	-	S	ag	7.8-8.2	250	rhw	48 h	EC50	0.44		Berglind & Dave, 1984
Daphnia magna, < 24 h	N	S	>95%	6.5	-	am	48 h	LC50	0.055		Oikari et al, 1992
Daphnia pulex, < 24 h	N	S	≥98%	7.9	100	am	48 h	LC50	2.0		Canton & Adema, 1978

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Gammarus pulex	N	S	>98%	8.2	200	am	48 h	LC50	0.7		Slooff, 1983
Streptocephalus rubricaudatus, cyst	N	S	ag	-	-	am	24 h	LC50	0.43		Crisinel et al., 1994
Streptocephalus texanus, cyst	N	S	ag	-	-	am	24 h	LC50	1.04		Crisinel et al., 1994
mollusca											
Dreissenia polymorpha, adult, 2cm	Y	S	pure	8	-	soft	96 h	LC50	0.11		Adema & Vink, 1981
Dreissenia polymorpha, adult 2 cm	Y	S	pure	8	-	hard	96 h	LC50	0.19		Adema & Vink, 1981
Indoplanorbis exustus (Na-PCP)	-	S	-	-	-	nw	96 h	LC50	0.18		Agrawal, 1987
Lymnaea acuminata	-	S	-	7.9	210	nw	96 h	LC50	0.104		Gupta & Rao, 1982
Lymnaea stagnalis, eggs	Y	S	pure	8	-	hard	96 h	LC50	0.24		Adema & Vink, 1981
Lymnaea stagnalis	N	S	>98%	8.2	200	am	48 h	LC50	0.56		Slooff, 1983
Spearium novaezelandiae	N	S	-	7.6	10	nw	96 h	EC50	1.1		Hickey & Martin, 1995
coelenterata											
Hydro oligactis	N	S	>98%	8.2	200	am	48 h	LC50	0.73		Slooff, 1983
pisces											
Brachydanio rerio	-	-	-	-	-	-	24 h	LC50	0.79		Devillers & Chambon, 1986
Brachydanio rerio	N	F	-	8.0	170	dtw	48 h	LC50	0.4		Slooff, 1979
Brachydanio rerio	N	S	-	7.5	-	-	96 h	LC50	0.45		Wellens, 1982
Colisa fasciatus	-	S	tech	6.8-7.6	66	tw	96 h	LC50	0.45		Verma et al., 1980
Jordanella floridae	Y	F	-	6.6-7.3	46-50	dtw	96 h	LC50	0.22	α	Smith et al., 1991
Lebistes reticulatus, 0.09 g	N	S	-	7.9	228	-	96 h	LC50	0.97		Gupta et al., 1982
Leuciscus idus	-	S	-	-	-	-	96 h	LC50	0.1		Knie et al., 1983
Notopterus notopterus	-	S	tech	6.8-7.6	66	tw	96 h	LC50	0.083		Verma et al., 1980
Oncorhynchus mykiss	-	S	92%	-	-	-	96 h	LC50	0.052		Little et al., 1990 (cited)
Oncorhynchus mykiss	Y	F	rg	-	-	dtw	96 h	LC50	0.16	α	Hodson et al., 1984
Oncorhynchus mykiss, egg-0 h	N	S	97%	7.2	50	dsw	96 h	LC50	3.0		van Leeuwen et al., 1985
Oncorhynchus mykiss, egg-24 h	N	S	97%	7.2	50	dsw	96 h	LC50	1.3		van Leeuwen et al., 1985
Oncorhynchus mykiss, 14 d eyed egg	N	S	97%	7.2	50	dsw	96 h	LC50	3.0		van Leeuwen et al., 1985
Oncorhynchus mykiss, 28 d eyed egg	N	S	97%	7.2	50	dsw	96 h	LC50	0.48		van Leeuwen et al., 1985
Oncorhynchus mykiss, sac fry 42 d	N	S	97%	7.2	50	dsw	96 h	LC50	0.032		van Leeuwen et al., 1985
Oncorhynchus mykiss, early fry 77 d	N	S	97%	7.2	50	dsw	96 h	LC50	0.018		van Leeuwen et al., 1985
Pimephales promelas, 30-35 d	N	F	-			nw		LC50	0.23		Hall & Kier, 1984; Hall et al., 1984
Pimephales promelas, 5g	-	R	-	-	-	-	48 h	LC50	0.3	a	Zhao & Wang, 1993

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Pimephales promelas, 30-35 d	-	F	-	7.2	43.3-48.5	nw	96 h	LC50	0.22		Phipps et al., 1981
Pimephales promelas	Y	S	97%	7.8	48	nw	96 h	LC50	0.24		Geiger et al., 1985
Poecilia reticulata	N	S	-	-	-	-	96 h	LC50	0.44		Shigeoka et al., 1988
Poecilia reticulata, young, bought	Y	S	pure	8	-	hard	96 h	LC50	0.72		Adema & Vink, 1981
Poecilia reticulata, young, lab.cult	Y	S	pure	8	-	hard	96 h	LC50	0.88		Adema & Vink, 1981
Poecilia reticulata, adult, bought	Y	S	pure	8	-	hard	96 h	LC50	0.45		Adema & Vink, 1981
Poecilia reticulata	-	S	-	7.8	-	-	96 h	LC50	0.8		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	7.3	-	-	96 h	LC50	0.4		Könemann & Musch, 1981
Poecilia reticulata	-	S	-	6.1	-	-	96 h	LC50	0.1		Könemann & Musch, 1981
Poecilia reticulata	-	S	pure	5	80-100	dtw	96 h	LC50	0.04		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	6	80-100	dtw	96 h	LC50	0.12		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	7	80-100	dtw	96 h	LC50	0.44		Saarikoski & Viluksela, 1981
Poecilia reticulata	-	S	pure	8	80-100	dtw	96 h	LC50	0.91		Saarikoski & Viluksela, 1981
Saccobranchus fossiliss	-	S	tech	6.8-7.6	66	tw	96 h	LC50	0.29		Verma et al., 1980
amphibia											
Ambystoma mexicanum, 3-4 w after hatching	-	S	-	8.2	200	DSW	48 h	LC50	0.30		Slooff & Baerselman, 1980
Xenopus laevis, 3-4 w after hatching	-	S	-	8.2	200	DSW	48 h	LC50	0.26		Slooff & Baerselman, 1980

a calculated by QSAR
b 3 different experiments performed in 2 different laboratoria
c dehydrogenase activity
d 2 different sources of cysts
e inhibition of phenol degradation

Table III. 57: Acute toxicity of pentachlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	0.5		Zhao & Wang, 1993
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	0.61		Ribo & Kaiser, 1983
Vibrio fisheri	N	S	ag	-	-	am	15 min	EC50	0.84		Crisinel et al., 1994
algae											
Chlamydomonas sp.	Y	S	pure	8	-	es	96 h	EC50	1.4	a, b	Adema & Vink, 1981
Chlorella ovalis	Y	S	pure	8	-	es	96 h	EC50	5.5	a, b	Adema & Vink, 1981
Dunaliella sp.	Y	S	pure	8	-	es	96 h	EC50	3.6	a, b	Adema & Vink, 1981
Monohrysis sp.	Y	S	pure	8	-	es	96 h	EC50	0.2	a, b	Adema & Vink, 1981
Phaeodactylum tricornutum	Y	S	pure	8	-	es	96 h	EC50	3.0	a, b	Adema & Vink, 1981
crustacea											
Artemia salina, cysts	N	S	ag	-	35 o/oo	rhw	24 h	LC50	3.9	c	Crisinel et al., 1994
Artemia salina, larvae, 3d	Y	S	pure	8	-	am	96 h	LC50	4.6		Adema & Vink, 1981
Artemia salina, adult, 1cm	Y	S	pure	8	-	am	96 h	LC50	16		Adema & Vink, 1981
Chaetogammarus marinus, larvae	Y	S	pure	8	-	am	96 h	LC50	0.55		Adema & Vink, 1981
Chaetogammarus marinus, adult	Y	S	pure	8	-	am	96 h	LC50	0.45		Adema & Vink, 1981
Crangon crangon, adult 4 cm	Y	S	pure	8	-	am	96 h	LC50	10		Adema & Vink, 1981
Crangon septemspinosa, 2.4-4.5 g	N	S	-	-	30 o/oo	nw	66 h	LC50	3.3		McLeese et al., 1979
Palaemonetes varians, adult 4 cm	Y	S	pure	8	-	am	96 h	LC50	7.5		Adema & Vink, 1981
Temora longicornis, adult 1 mm	Y	S	pure	8	-	am	96 h	LC50	0.17		Adema & Vink, 1981
mollusca											
Crepidula fornicata, larvae	Y	S	pure	8	-	nw	48 h	LC50	1.20		Adema & Vink, 1981
Mytilus edulis, adult, 2 cm	Y	S	pure	8	-	nw	96 h	LC50	18		Adema & Vink, 1981
annelida											
Ophryotrocha diadema, larvae, 3 d	Y	S	pure	8	33 o/oo	am	96 h	LC50	0.62		Adema & Vink, 1981
Ophryotrocha diadema, adult 4w	Y	S	pure	8	33 o/oo	am	96 h	LC50	1.20		Adema & Vink, 1981
pisces											
Cyprinodon variegatus	-	F	-	-	-	-	96 h	LC50	0.44		Parrish et al., 1978
Gobius minutus, adult	Y	S	pure	8	-	nw	48 h	LC50	0.45		Adema & Vink, 1981
Pleuronectes platessa, yolk-sac larva	Y	S	pure	8	-	am	96 h	LC50	0.14		Adema & Vink, 1981
Pleuronectes platessa,larva, stage 3	Y	S	pure	8	-	am	96 h	LC50	0.06		Adema & Vink, 1981

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Pleuronectes platessa, juv. 4.5-8 cm	Y	S	pure	8	-	nw	96 h	LC50	0.14		Adema & Vink, 1981
Pleuronectes platessa, ~ 10cm	Y	S	pure	8	-	nw	96 h	LC50	0.17		Adema & Vink, 1981
Pleuronectes platessa, ~20 cm	Y	S	pure	8	-	nw	96 h	LC50	0.15		Adema & Vink, 1981
Pleuronectes platessa, egg	Y	S	pure	8	-	am	96 h	LC50	0.75		Adema & Vink, 1981
Poecilia reticulata, young, lab.cult	Y	S	pure	8	-	nw	96 h	LC50	1.60		Adema & Vink, 1981
Poecilia reticulata, adult, bought	Y	S	pure	8	-	nw	96 h	LC50	1.15		Adema & Vink, 1981

a growth
b es: enriched seawater
c rhw: reconstituted hard water

Table III. 58: Chronic toxicity of pentachlorophenol to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Pseudomonas fluorescens	N	S	-	-	81	am	7 h	NOEC	1	d	Slooff & Canton, 1983
protozoa											
Tetrahymena pyriformis	N	S	ag	-	-	am	48 h	NOEC	0.08	d	Schäfer et al., 1994
Tetrahymena pyriformis	N	S	ag	-	-	am	96 h	NOEC	0.1	d	Schäfer et al., 1994
rotatoria											
Brachionus calyciflorus	Y	R	ag	-	100	am	96 h	NOEC	0.2	f	Janssen et al., 1994
cyanophyta											
Microcystis aeruginosa	N	S	-	-	24	am	4 d	NOEC	1	d	Slooff & Canton, 1983
algae											
Chlamydomonas reinhardi	N	S	ag	-	-	am	72 h	NOEC	0.03	d	Schäfer et al., 1994
Chlamydomonas reinhardi	N	S	ag	-	-	am	24 h	NOEC	0.09	g	Schäfer et al., 1994
Chlamydomonas reinhardi	Y	F	ag	-	-	am	4 d	NOEC	0.3	d	Schäfer et al., 1994
Chlamydomonas reinhardi	Y	F	ag	-	-	am	7 d	NOEC	0.36	d	Schäfer et al., 1994
Chlamydomonas reinhardi	Y	F	ag	-	-	am	10 d	NOEC	0.36	d	Schäfer et al., 1994
Scenedesmus pannonicus	N	S	-	-	54	am	4 d	NOEC	0.1	d	Slooff & Canton, 1983
Scenedesmus subspicatus	N	S	ag	-	-	am	72 h	NOEC	0.135	d	Schäfer et al., 1994
Scenedesmus subspicatus	N	S	ag	-	-	am	24 h	NOEC	0.14	g	Schäfer et al., 1994
macrophyta											
Lemna minor	N	S	-	-	268	am	7 d	NOEC	1	d	Slooff & Canton, 1983
crustacea											
Daphnia magna, 1 d	Y	R	-	7.9	100	am	21 d	NOEC	0.18	a	Adema, 1978
Daphnia magna, 1 d	Y	R	-	7.9	100	am	21 d	NOEC	0.32	b	Adema, 1978
Daphnia magna, 1 d	N	R	-	8.2	200	am	21 d	NOEC	0.1	a, b	Slooff & Canton, 1983
insecta											
Culex pipiens, 1st instar	N	R	-	8.2	200	am	25 d	NOEC	3.2	a, e	Slooff & Canton, 1983
coelenterata											
Hydra oligactis	N	R	-	8.2	200	am	21 d	NOEC	0.032	d	Slooff & Canton, 1983
mollusca											
Lymnea stagnalis, eggs	Y	S	pure	8	hard	-	16 d	NOEC	0.05	c	Adema & Vink, 1981

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
Lymnea stagnalis, 5 m	N	R	-	8.2	200	am	40 d	NOEC	0.1	a	Slooff & Canton, 1983
Lymnea stagnalis, 5 m	N	R	-	8.2	200	am	40 d	NOEC	0.01	b	Slooff & Canton, 1983
Lymnea stagnalis, eggs	N	R	-	8.2	200	am	7 d	NOEC	0.0032	c	Slooff & Canton, 1983
pisces											
Jordanella floridae, < 24 h eggs	Y	F	-	6.6-7.3	46-50	dnw	15 d	NOEC	0.055	a	Smith et al., 1991
Jordanella floridae, < 24 h eggs	Y	F	-	6.6-7.3	46-50	dnw	5 d	NOEC	0.10	c	Smith et al., 1991
Jordanella floridae, 7 d fry	Y	F	-	6.6-7.3	46-50	dnw	28 d	NOEC	0.10	a	Smith et al., 1991
Oryzias latipes, eggs	N	R	-	8.2	200	am	40 d	NOEC	0.032	a	Slooff & Canton, 1983
Oryzias latipes, eggs	N	R	-	8.2	200	am	40 d	NOEC	0.32	c, d	Slooff & Canton, 1983
Poecilia reticulata, 3-4 w	N	R	-	8.2	200	am	28 d	NOEC	0.32	a	Slooff & Canton, 1983
Poecilia reticulata, 3-4 w	N	R	-	8.2	200	am	28 d	NOEC	0.10	d	Slooff & Canton, 1983
amphibia											
Xenopus laevis, < 2 d	N	R	-	8.2	200	am	100 d	NOEC	0.032	a, d, e	Slooff & Canton, 1983

a mortality
b reproduction
c hatchability
d growth
e development
f intrinsic rate of natural increase
g effective photosynthesis rate

Table III. 59: Chronic toxicity of pentachlorophenol to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Artemia salina, larvae, 3d	Y	S	pure	8	-	am	28 d	NOEC	5.8	b	Adema & Vink, 1981
Chaetogammarus marinus, larvae	Y	S	pure	8	-	am	8 w	NOEC	0.10	c	Adema & Vink, 1981
annelida											
Ophryotrocha diadema, larvae, 3 d	Y	R	pure	8	33	am	48 d	NOEC	0.03	a, e	Hooftman & Vink, 1980
Ophryotrocha diadema, larvae, 3 d	Y	R	pure	8	33	am	48 d	NOEC	0.1	d, g	Hooftman & Vink, 1980
Ophryotrocha diadema, larvae, 3 d	Y	R	pure	8	33	am	48 d	NOEC	0.003	f	Hooftman & Vink, 1980
Ophryotrocha diadema, adult 4w	Y	R	pure	8	33	am	37 d	NOEC	0.1	a	Hooftman & Vink, 1980
Ophryotrocha diadema, adult 4w	Y	R	pure	8	33	am	37 d	NOEC	0.03	d	Hooftman & Vink, 1980
Ophryotrocha diadema, adult 4w	Y	R	pure	8	33	am	37 d	NOEC	0.01	f	Hooftman & Vink, 1980
pisces											
Pleuronecta platessa, eggs	Y	S	pure	8	-	nw	60 d	NOEC	< 0.18	c	Adema & Vink, 1981
Poecilia reticulata, young	Y	S	pure	8	-	am	8 w	NOEC	0.010	a, c	Adema & Vink, 1981

a mortality
b reproduction inhibition
c growth
d mean number of egg masses per animal
e mean number of larvae per egg mass
f mortality in egg mass, reproductive potenial
g mean number of eggs per egg mass

Table III. 60: Acute toxicity of pentachlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	3.2	16	a	Hulzebos et al., 1993
Lactuca sativa	loam	7.5	2.0	15.0	22	14 d	EC50	8	40	a	Van Gestel et al., 1996
Lactuca sativa	artificial soil	6.2	8.1	8.1	22	14 d	EC50	3	3.7	a	Van Gestel et al., 1996
annelida											
Eisenia andrei, adult	peat	3.8	15.6	9.0	23	14 d	LC50	502	322		Van Gestel & Ma, 1990
Eisenia andrei, adult	artificial soil	6.0	8.1	8.1	23	14 d	LC50	83	102		Van Gestel & Ma, 1990
Eisenia andrei, adult	sand	5.6	6.1	2.4	23	14 d	LC50	142	233		Van Gestel & Ma, 1990
Eisenia andrei, adult	sand	5.0	3.7	1.4	23	14 d	LC50	84	227		Van Gestel & Ma, 1990
Eisenia fetida	artificial soil	7.0	10	5	22	28 d	LC50	87	87		Heimbach, 1984
Eisenia fetida andrei, > 6 w	artificial soil	7.0	7.7	10.4	23	14 d	LC50	28.5	37		Van Gestel & van Dis, 1988
Eisenia fetida andrei, > 6 w	sand	7.0	1.7	4.3	23	14 d	LC50	16	80		Van Gestel & van Dis, 1988
Eisenia fetida andrei, > 6 w	sand	4.1	1.7	4.3	23	14 d	LC50	52	260		Van Gestel & van Dis, 1988
Eisenia andrei, juvenile	artificial soil	6.0	10	20	20	35 d	LC50	28	28		Van Gestel et al., 1991
Eisenia andrei, adult	artificial soil	6.0	10	20	20	35 d	LC50	72	72		Van Gestel et al., 1991
Enchytraeus albidus	artificial soil	6.5	10	20	12	28 d	LC50	136	136		Denneman & van Gestel, 1990
Lumbricus rubellus, adult	peat	3.8	15.6	9.0	23	14 d	LC50	2298	1473		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	artificial soil	6.0	8.1	8.1	23	14 d	LC50	362	447		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	sand	5.6	6.1	2.4	23	14 d	LC50	1013	1661		Van Gestel & Ma, 1990
Lumbricus rubellus, adult	sand	5.0	3.7	1.4	23	14 d	LC50	1206	3260		Van Gestel & Ma, 1990

a growth

Table III. 61: Chronic toxicity of pentachlorophenol to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.5	1.6	-	23	14d	NOEC	0.32	1.6	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.5	1.6	-	23	7 d	NOEC	0.32	1.6	a	Adema & Henzen, 1989
bacteria											
Rhizobium leguminosarum trifolii	sandy loam	6.5	2.7	-	20	6 m	NOEC	50	185		Chaudri et al., 1996
annelida											
Eisenia andrei, juvenile	artificial soil	6.1	10	20	20	10 w	NOEC	> 32	>32	a, b	van Gestel et al., 1991
Eisenia fetida andrei, adult, 8-13 w	artificial soil	6.2	10	20	20	3 w	NOEC	32	32	c	van Gestel et al., 1989
Eisenia fetida andrei, adult, 8-13 w	artificial soil	6.2	10	20	20	3 w	NOEC	10	10	d	van Gestel et al., 1989

a growth
b sexual development
c cocoon production
d cocoon hatchability was determined after incubation of the cocoons in untreated soil for 5 weeks

Table III. 62: Toxicity of pentachlorophenol to terrestrial processes

microbial processes / enzyme activity	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/$kg_{d.w.}$]	result stand. soil [mg/$kg_{d.w.}$]	note	reference
H_2-oxidizing potential	sandy loam	7	3	18	25	2 h	EC50	177	590		Denneman & van Gestel, 1990
ATP-content	agricultural	6.4	3.1	33.6	20	48 d	NOEC	2	6.5		Denneman & van Gestel, 1990
acetate mineralization	sand-S	4.8	8.8	2.5	10	43 h	NOEC	210	840		van Beelen & Fleuren-Kemilå, 1993
acetate mineralization	sand, sub-S	5.9	<0.17	0.5	10	43 h	NOEC	27-41	135-205		van Beelen & Fleuren-Kemilå, 1993
acetate mineralization	sand, Dune	4.4	1.02	0.4	10	43 h	NOEC	800	4000		van Beelen & Fleuren-Kemilå, 1993
acetate mineralization	sand, Dune	4.4	0.85	0.5	10	43 h	NOEC	3-8	15-40		van Beelen & Fleuren-Kemilå, 1993
acetate mineralization	sand, meadow	6.4	<0.17	< 0.1	10	18 d	NOEC	1200	6000		van Beelen et al., 1991
acetate mineralization	sand, meadow	6.4	<0.17	< 0.1	10	41 d	NOEC	750	3750		van Beelen et al., 1991
acetate mineralization	sand, wood	4.5	0.85	0.4	10	24 h	NOEC	47	235		van Beelen et al., 1991
acetate mineralization	sand, wood	4.5	0.85	0.4	10	9 d	NOEC	144	720		van Beelen et al., 1991
acetate mineralization	Flevoland	8.2	1.02	1	10	18 h	NOEC	41	205		van Beelen et al., 1994
acetate mineralization	Flevoland, subsoil	8.3	1.87	1.2	10	4 d	NOEC	292	1460		van Beelen et al., 1994
acetate mineralization	Peel	3.8	4.42	0.9	10	6 d	NOEC	588	1330		van Beelen et al., 1994
acetate mineralization	Peel, subsoil	4.5	0.34	1.4	10	41 d	NOEC	113	565		van Beelen et al., 1994
biomass carbon	sand	6.9	4.5	12.5	-	-	EC71	9	20		Meghara et al., 1998
dehydrogenase	sand	6.9	4.5	12.5	-	-	EC71	9	20		Meghara et al., 1998
nitrate reductase	sand	6.9	4.5	12.5	-	-	EC76	9	20		Meghara et al., 1998

Table III. 63: Deviating tests for pentachlorophenol in soil

organism / microbial processes / enzyme activity	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
algae											
algal populations, unspec.	sand	6.9	4.5	12.5	-	-	EC92	9	20	a	Meghara et al., 1998
nematoda											
Panagrellus redivivus	aqueous solution	7.5			21	96 h	LC50	13 mg/l			Debus & Niemann, 1994
microbial processes											
biomass carbon	sand	6.9	4.5	12.5	-	-	EC71	9	20		Meghara et al., 1998
enzyme activity											
urease	sand	6.9	4.5	12.5	-	-	EC87	9	20		Meghara et al., 1998

a algal populations (most probable number) in PCP-contaminated soil compared with uncontaminated soil

Table III. 64: Acute toxicity of 1-chloronaphthalene to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
algae											
Selenastrum capricornutm	-	S	-	-	-	-	96 h	EC50	1.03		LeBlanc., 1984
crustacea											
Daphnia magna, =< 24 h	-	S	>=80%	7.4-9.4	160-186	rnw	48 h	LC50	1.6		LeBlanc, 1980
pisces											
Lepomis macrochirus	-	S	-	-	-	-	96 h	LC50	2.3		LeBlanc, 1984

Table III. 65: Acute toxicity of 1-chloronaphthalene to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	1.7		Zhao & Wang, 1993
algae											
Skeletonema costatum	-	S	-	-	-	-	96 h	EC50	1.13		LeBlanc, 1984
crustacea											
Artemia salina, 30-d post hatch	-	S	-	-	-	-	24 h	LC50	0.78		Hooftman & Janssen, 1986
Artemia salina, nauplii	-	S	>=97%	-	-	-	24 h	LC50	1.8		Abernethy et al., 1986
Artemia salina, 2nd instar	-	S	98%	-	32 o/oo	am	24 h	LC50	0.91		Foster & Tullis, 1984
Mysidopsis bahia	-	S	-	-	-	-	96 h	LC50	0.37		LeBlanc, 1984
pisces											
Cyprinodon variegatus	Y	F	-	-	-	nw	96 h	LC50	0.69		Ward & Parrish, 1981
Cyprinodon variegatus,, 8-15 mm	N	S	-	-	10-31o/oo	nw	96 h	LC50	2.4		Heitmuller et al., 1981

Table III. 66: Chronic toxicity of 1-chloronaphthalene to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
pisces											
Cyprinodon variegatus, embryo	Y	F	-	-	-	nw	28 d	NOEC	0.39	a α	Ward & Parrish, 1981

a mortality

Table III. 67: Acute toxicity of 2-chloronaphthalene to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna, 4-6 d	-	S	>=97%	-	-	-	48 h	LC50	1.6		Abernethy et al., 1986

Table III. 68: Acute toxicity of 2-chloronaphthalene to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
*Artemia salina,*nauplii	-	S	>=97%	-	-	-	24 h	LC50	2.3		Abernethy et al., 1986

Appendix IV Toxicity data on other compounds

In this appendix toxicity data on the remaining compounds (e.g. phthalates) are presented.

Content

Table IV. 1: Acute toxicity of dimethyl phthalate (DMP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	N	S	-	-	-	-	48 h	EC50	537		Staples et al., 1997 (review)
alga											
Pseudokirchneriella subspicata	Y	S	-	7.8	25-50	-	96 h	EC50	142		Adams et al., 1995
crustacea											
Daphnia magna	Y	S	-	7.8	25-50	-	48 h	EC50	46		Adams et al., 1995
insecta											
Paratanytarsus parthenogenica	Y	S	-	7.8	25-50	-	96 h	LC50	377		Adams et al., 1995
pisces											
Lepomis macrochirus	Y	S	-	7/8	25-50	-	96 h	LC50	50		Adams et al., 1995
Oncorhynchus mykiss	Y	S	-	7.8	25-50	-	96 h	LC50	56		Adams et al., 1995
Pimephales promelas	Y	S	-	7.8	25-50	-	96 h	LC50	121		Adams et al., 1995
Pimephales promelas	Y	F	-	7.8	25-50	-	96 h	LC50	39		Adams et al., 1995

Table IV. 2: Acute toxicity of dimethyl phthalate (DMP) to marine organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fischeri	N	S	-	-	-	-	5-30 min	EC50	16-18		Staples et al., 1997 (review)
algae											
Gymnodinium breve	N	S	-	-	-	am	96 h	EC50	96	a	Wilson et al., 1978
Gymnodinium breve	N	S	-	-	-	am	96 h	EC50	54	a	Wilson et al., 1978
crustacea											
Mysidopsis bahia	Y	S	-	-	-	-	96 h	LC50	69		Adams et al., 1995
Nitroca spinipes	N	S	-	7.8	7	nw	96 h	EC50	62		Linden et al., 1979
pisces											
Alburnus alburnus	N	S	-	7.8	7	nw	96 h	LC50	100-115		Linden et al., 1979
Cyprinodon variegatus	Y	S	--	-	-	-	96 h	LC50	29		Adams et al., 1995
Cyprinodon variegatus	N	S	>80%	-	10-31	-	96 h	LC50	58		Heitmuller et al., 1981

a growth rate, replicate experiments

Table IV. 3: Chronic toxicity of dimethyl phthalate (DMP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna	Y	F	comm	8.1	150-180	nw	21 d	NOEC	9.6	a	Rhodes et al., 1995

a mortality

Table IV. 4: Chronic toxicity of dimethyl phthalate (DMP) to marine organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Palaemonetea pugio	Y	S	-	-	17	am	30 d	NOEC	10	a	Laughlin et al., 1978

a larval mortality

Table IV. 5: toxicity of dimethyl phthalate (DMP) to terrestrial species

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$]	result stand. soil [$mg/kg_{d.w.}$]	note	reference
annelida											
Eisenia fetida	artificial soil	6.0	10	20	20	14 d	LC50	3160	3160		Neuhauser et al., 1985
macrophyta											
Pisum sativum	potting soil	-	-	-	23-25	14 d	EC50	1000	-		Herring & Bering, 1988
Pisum sativum	soaked in water	-	-	-	23-25	13 d	EC33	1000	-		Herring & Bering, 1988
Spinacia oleracea	potting soil	-	-	-	23-25	14 d	EC64	1000	-		Herring & Bering, 1988
Spinacia oleracea	soaked in water	-	-	-	23-25	13 d	EC15	1000	-		Herring & Bering, 1988

Table IV. 6: Acute toxicity of diethyl phthalate (DEP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Tetrahymena pyriformis	N	S	-	-	-	-	48 h	EC50	132		Staples et al., 1997 (review)
algae											
Pseudokirchneriella subspicata	Y	S	-	7.8	25-50	-	96 h	EC50	16		Adams et al., 1995
Scenedesmus subspicatus	N	S	-				72 h	EC50	45	a	Kühn & Pattard, 1990
crustacea											
Daphnia magna	Y	S	-	7.8	25-50	-	48 h	EC50	86		Adams et al., 1995
Daphnia magna	N	S	-	8.0		am	24 h	EC50	41		Bringmann & Kühn, 1982
Daphnia magna	N	S	-	7.6	272	tap	24 h	LC50	75		Bringmann & Kühn, 1977a
Daphnia magna	N	S	-	7.6	272	tap	24 h	EC50	86		Kühn et al., 1989
insecta											
Paratanytarsus parthenogenica	Y	S	-	7.8	25-50	-	96 h	LC50	131		Adams et al., 1995
pisces											
Lepomis macrochirus	N	S	>80%	7.2	32-60	nw	96 h	LC50	110		Buccafusco et al., 1981
Lepomis macrochirus	Y	S	-	7/8	25-50	-	96 h	LC50	16.7		Adams et al., 1995
Leuciscus idus melanotus	N	F	-	-	-	-	48 h	LC50	53		Juhnke & Lüdemann, 1978
Leuciscus idus melanotus	N	F	-	-	-	-	48 h	LC50	61		Juhnke & Lüdemann, 1978
Oncorhynchus mykiss	Y	S	-	7.8	25-50	-	96 h	LC50	12		Adams et al., 1995
Pimephales promelas	Y	S	-	7.8	25-50	-	96 h	LC50	16.8		Adams et al., 1995
Pimephales promelas	Y	F	-	7.8	25-50	-	96 h	LC50	17		Adams et al., 1995
Pimephales promelas	Y	F	99%	7.4	44.6	-	96 h	LC50	31.8		Geiger et al., 1985

a growth rate

Table IV. 7: Acute toxicity of diethyl phthalate (DEP) to marine organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
algae											
Gymnodinium breve	N	S	-	-	-	am	96 h	EC50	6.1		Wilson et al., 1978
Gymnodinium breve	N	S	-	-	-	am	96 h	EC50	3		Wilson et al., 1978
crustacea											
Mysidopsis bahia	N	S	-	-	-	-	96 h	LC50	10.3		Adams et al., 1995
pisces											
Cyprinodon variegatus	Y	S	--	-	-	-	96 h	LC50	29		Adams et al., 1995
Cyprinodon variegatus	N	S	>80%	-	10-31	-	96 h	LC50	30		Heitmuller et al., 1981

Table IV. 8: Chronic toxicity of diethyl phthalate (DEP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Chilomonas paramecium	N	S	-	6.9		am	48 h	NOEC	53		Bringmann & Kühn, 1980b
Entosiphon sulcatum	N	S	-	6.9		am	72 h	NOEC	19		Bringmann & Kühn, 1978a
Uronema parduczi	N	S	-	6.9		am	20 h	NOEC	48		Bringmann & Kühn, 1980b
cyanophyta											
Microcystis aeruginosa	N	S	-	7.0		am	8d	NOEC	15		Bringmann & Kühn, 1976
algae											
Scenedesmus quadricauda	N	S	-	7.0		am	8 d	NOEC	10		Bringmann & Kühn, 1977b
crustacea											
Daphnia magna	Y	F	comm	8.1	150-180	nw	21 d	NOEC	25		Rhodes et al., 1995
Daphnia magna	N	S	-	7.6	272	tap	21 d	NOEC	13		Kühn et al., 1989

Table IV. 9: Toxicity of diethyl phthalate (DEP) to terrestrial species

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
macrophyta											
Pisum sativum	potting soil	-	-	-	23-25	14 d	EC20	1000	-		Herring & Bering, 1988
Pisum sativum	soaked in water	-	-	-	23-25	13 d	EC52	1000	-		Herring & Bering, 1988
Lactuca sativa	OECD	7.8	1.4	12	20	7 d	EC50	106	530		Hulzebos et al., 1993
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	134	670		Hulzebos et al., 1993
Spinacia oleracea	potting soil	-	-	-	23-25	14 d	EC25	1000	-		Herring & Bering, 1988
Spinacia oleracea	soaked in water	-	-	-	23-25	13 d	EC27	1000	-		Herring & Bering, 1988

Table IV. 10: Toxicity of di-n-butyl phthalate (DBP) to terrestrial species

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.8	1.4	12	20	7 d	EC50	387	1935		Hulzebos et al., 1993
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	>1000	>5000		Hulzebos et al., 1993

Table IV. 11: Acute toxicity of di-iso-butyl phthalate (DIBP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
pisces											
Pimephales promelas	Y	F					96 h	LC50	0.9		Geiger et al., 1985

Table IV. 12: Acute toxicity of di-iso-butyl phthalate (DIBP) to marine organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Nitroca spinipes	N	S	-	7.8	7	nw	96 h	EC50	3.0		Linden et al., 1979

Table IV. 13: Chronic toxicity of di-n-hexyl phthalate (DHP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna	Y	F	comm	8.1	150-180	nw	21 d	NOEC	0.084	a	Rhodes et al., 1995

a mortality and reproduction

Table IV. 14: Acute toxicity of butylbenzyl phthalate (BBP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
algae											
Dunaliella tertiolecta	N	S	comm	-	-	-	96 h	EC50	1		Gledhill et al., 1980
Microcystus aeruginosa	N	S	comm	-	-	-	96 h	EC50	1000	a	Gledhill et al., 1980
Navicula pelliculosa	N	S	comm	-	-	-	96 h	EC50	0.6		Gledhill et al., 1980
Pseudokirchneriella subspicata	N	S	comm	-	-	-	96 h	EC50	0.4		Gledhill et al., 1980
Pseudokirchneriella subspicata	Y	S	-	7.8	25-50	-	96 h	EC50	0.21		Adams et al., 1995
Skeletonema costatum	N	S	comm	-	-	-	96 h	EC50	0.6		Gledhill et al., 1980
crustacea											
Daphnia magna	N	S	comm	7.7	120-250	-	48 h	LC50	0.82		Adams & Heidolph, 1985
Daphnia magna	N	S	comm	7.8	110	nw	48 h	EC50	3.7		Gledhill et al., 1980
pisces											
Lepomis macrochirus	N	S	>80%	7.2	32-60	nw	96 h	LC50	43	a	Buccafusco et al., 1981
Lepomis macrochirus	N	S	comm	7.5	40	rw	96 h	LC50	1.7		Gledhill et al., 1980
Lepomis macrochirus	Y	S	-	7/8	25-50	-	96 h	LC50	1.70		Adams et al., 1995
Oncorhynchus mykiss	Y	F	-	7.8	25-50	-	96 h	LC50	0.82		Adams et al., 1995
Oncorhynchus mykiss	N	S	comm	7.5	40	rw	96 h	LC50	3.3		Gledhill et al., 1980
Pimephales promelas	Y	F	-	7.8	25-50	-	96 h	LC50	1.50		Adams et al., 1995
Pimephales promelas	N	S	comm	7.5	40	rw	96 h	LC50	2.1		Gledhill et al., 1980
Pimephales promelas	N	S	comm	7.5	160	rw	96 h	LC50	5.3		Gledhill et al., 1980

a more than 10 times the water solubility (recommended value of 2.7 mg/l by Staples et al., 1997)

Table IV. 15: Acute toxicity of butylbenzyl phthalate (BBP) to marine organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Mysidopsis bahia	N	S	comm		18	nw	96 h	LC50	0.9		Gledhill et al., 1980
pisces											
Cymatogaster aggregata	Y	F	-	-	31	-	96 h	LC50	0.51		Ozretich et al, 1983
Cyprinodon variegatus	N	S	>80%	-	10-31	-	96 h	LC50	440	a	Heitmuller et al., 1981
Cyprinodon variegatus	N	S	comm	-	24	nw	96 h	LC50	3.0		Gledhill et al., 1980
Parophrys vetulus	N	S	-	7.3	25	-	96 h	LC50	0.66		Randall et al., 1983
Parophrys vetulus	Y	F	-	7.3	31	-	96 h	LC50	0.55		Randall et al., 1983

a more than 10 times the water solubility (recommended value of 2.7 mg/l by Staples et al., 1997)

Table IV. 16: Chronic toxicity of butylbenzyl phthalate (BBP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna	Y	S	comm	7.9	240-310	-	21 d	NOEC	0.35	a, b, c	Adams & Heidolph, 1985
Daphnia magna	Y	F	comm	8.2	160-180	-	21 d	NOEC	0.26	c	Adams & Heidolph, 1985
Daphnia magna	Y	F	comm	8.1	150-180	nw	21 d	NOEC	0.28	a, c	Rhodes et al., 1995
Daphnia magna	Y	F	comm	8.1	175	nw	21 d	NOEC	0.26	c	Gledhill et al., 1980

a mortality
b growth
c reproduction

Table IV. 17: Chronic toxicity of dioctyl phthalate (DOP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna	N	F	99.5	7.9	85	-	16 d	NOEC	0.32	a, b	McCarthy & Whitmore, 1985
pisces											
Pimephales promelas	N	F	99.5	7.9	85	-	20 d	NOEC	3.2	a, c	McCarthy & Whitmore, 1985

a More than 10 times the water solubility (recommended value of 0.5 µg/l by Staples et al., 1997)
b fecundity
c hatchability

Table IV. 18: Acute toxicity of diethylhexyl phthalate (DEHP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna	N	S	comm	7.7	120-250	-	48 h	LC50	2		Adams & Heidolph, 1985
Daphnia pulex	N	S	-	-	-	-	48 h	LC50	0.133	a	Staples et al., 1997 (review)
macrophyta											
Lemna gibba	N	S	-	-	-	-	7 d	EC50	2060		Wang, 1989 (review)

a results from 3 tests

Table IV. 19: Acute toxicity of diethylhexyl phthalate (DEHP) to marine organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fischeri	N	S	-	-	-	-	5-30 min	EC50	800		Staples et al., 1997 (review)
algae											
Gymnodinium breve	N	S	-	-	-	am	96 h	EC50	31000	a	Wilson et al., 1978

a growth rate, replicate experiments

Table IV. 20: Chronic toxicity of diethylhexyl phthalate (DEHP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna	Y	S	comm	7.9	240-310	-	21 d	NOEC	0.64	a, c	Adams & Heidolph, 1985
Daphnia magna	Y	F	techn.	7.9	300	nw	21 d	NOEC	0.158	a, c	Knowles et al., 1987
Daphnia magna	Y	F	comm	8.1	150-180	nw	21 d	NOEC	0.077	a	Rhodes et al., 1995
Daphnia magna	N	S	97%	-	-	-	21 d	NOEC	0.32	c	Adema et al., 1981
Daphnia magna	N	S	97%	-	-	-	14 d	NOEC	0.032	d	Adema et al., 1981
pisces											
Oncorhynchus mykiss	N	F	-	-	-	-	90 d	NOEC	0.054	b	Staples et al., 1997 (review)
Pimephales promelas	N	F	-	-	-	-	127 d	NOEC	0.10	b	Staples et al., 1997 (review)
Salvelinus fontinalis	N	F	-	-	-	-	150 d	NOEC	0.052	b	Staples et al., 1997 (review)

a survival
b growth
c reproduction
d mortality F1 generation

Table IV. 21: Chronic toxicity of diethylhexyl phthalate (DEHP) to marine organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Palaemonetea pugio	Y	S	-	-	17	am	28 d	NOEC	1	a	Laughlin et al., 1978

a larval mortality

Table IV. 22: Toxicity of diethylhexyl phthalate (DEHP) to terrestrial species

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [mg/kg$_{d.w.}$]	result stand. soil [mg/kg$_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.8	1.4	12	20	7 d	EC50	>1000	>5000	a	Hulzebos et al., 1993
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	>1000	>5000	a	Hulzebos et al., 1993

a growth

Table IV. 23: Chronic toxicity of di-iso-decyl phthalate (DIDP) to fresh water organisms

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna	Y	F	comm	8.1	150-180	nw	21 d	NOEC	0.030	ab	Rhodes et al., 1995
Daphnia magna	Y	F	comm	8.1	150-180	nw	21 d	NOEC	0.060	ac	Rhodes et al., 1995

a far above water solubility
b mortality
c reproduction

Table IV. 24: Acute toxicity of cyclohexanone to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
algae											
Chlamydomonas reinhardtii	Y	S	ag	6.5-7.5	-	am	72 h	EC50	32.9	a	Brack & Rottler, 1994
crustacea											
Daphnia magna, 24 h	N	S	-	7.6	272	am	24 h	LC50	800		Bringmann & Kühn, 1977a
pisces											
Leuciscus idus melanotus	N	S	-	7-8	255	tap	48 h	LC50	536, 752		Juhnke & Lüdemann, 1978
Pimephales promelas	Y	S	99.8%	7.6	47.1	nw	96 h	LC50	527		Brooke et al., 1984
Pimephales promelas	-	S	-	-	-	am	96 h	LC50	634		Vaishnav & Korthals, 1990

a sealed bipartite vessels

Table IV. 25: Acute toxicity of cyclohexanone to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	110		Zhao & Wang, 1993

Table IV. 26: Chronic toxicity of cyclohexanone to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Chilomonas paramaecium	N	S	-	6.9	142	am	48 h	NOEC	573		Bringmann et al., 1980
Entosiphon sulcatum	N	S	-	6.9	142	am	72 h	NOEC	545		Bringmann, 1978
Uronema parduczi	N	S	-	6.9	142	am	20 h	NOEC	280		Bringmann & Kühn, 1980b
bacteriophyta											
Pseudomonas putida	N	S	-	7.0	60	am	16 h	NOEC	180		Bringmann & Kühn, 1976
cyanophyta											
Microcystis aeruginosa	N	S	-	7.0	60	am	8 d	NOEC	52		Bringmann & Kühn, 1978a,b
algae											
Scenedesmus quadricauda	N	S	-	7.0	-	am	8 d	NOEC	370		Bringmann & Kühn, 1977b

Table IV. 27: Acute toxicity of pyridine to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
insecta											
Chironomus gr. thummi	N	S	>98%	8.2	200	am	48 h	LC50	229		Slooff, 1983
Cloëon dipterum	N	S	>98%	8.2	200	am	48 h	LC50	165		Slooff, 1983
Corixa punctata	N	S	>98%	8.2	200	am	48 h	LC50	30		Slooff, 1983
Ischnura elegans	N	S	>98%	8.2	200	am	48 h	LC50	410		Slooff, 1983
Nemoura cinerea	N	S	>98%	8.2	200	am	48 h	LC50	254		Slooff, 1983
coelenterata											
Hydro oligactis	N	S	>98%	8.2	200	am	48 h	LC50	1150		Slooff, 1983
annelida											
Dugesia cf. lugubris	N	S	>98%	8.2	200	am	48 h	LC50	1900		Slooff, 1983
Erpobdella octoculata	N	S	>98%	8.2	200	am	48 h	LC50	2400		Slooff, 1983
Tubificidae	N	S	>98%	8.2	200	am	48 h	LC50	1300		Slooff, 1983
mollusca											
Lymnaea stagnalis	N	S	>98%	8.2	200	am	48 h	LC50	350		Slooff, 1983
crustacea											
Asellus aquaticus	N	S	>98%	8.2	200	am	48 h	LC50	220		Slooff, 1983
Daphnia curculata, 11 d	N	S	>=98%	7.9	100	am	48 h	LC50	2470		Canton & Adema, 1978
Daphnia magna, < 1 d	N	S	-	8.0	-	am	24 h	LC50	240		Bringmann & Kühn, 1977a
Daphnia magna, < 1 d	N	S	-	8.0	-	am	24 h	EC50	520		Bringmann & Kühn, 1982
Daphnia magna, < 1 d	N	S	>=98%	7.9	100	am	48 h	LC50	1165	a	Canton & Adema, 1978
Daphnia magna, < 1 d	N	S	>=98%	7.9	100	am	48 h	LC50	1755	a	Canton & Adema, 1978
Daphnia magna, < 1 d	N	S	>=98%	7.9	100	am	48 h	LC50	1130	a	Canton & Adema, 1978
Daphnia pulex, < 1 d	N	S	>=98%	7.9	100	am	48 h	LC50	575		Canton & Adema, 1978
Gammarus pulex	N	S	>98%	8.2	200	am	48 h	LC50	182		Slooff, 1983
pisces											
Brachydanio rerio	N	S	-	7.5	-	-	96 h	LC50	>512		Wellens, 1982
Pimephales promelas	Y	S	>99%	7.7	47.4	nw	96 h	LC50	94		Geiger et al., 1986
amphibia											
Ambystoma mexicanum, 3-4 w after hatching	-	S	-	8.2	200	DSW	48 h	LC50	950		Slooff & Baerselman, 1980
Xenopus laevis, 3-4 w after hatching	-	S	-	8.2	200	DSW	48 h	LC50	1400		Slooff & Baerselman, 1980

a 3 different experiments performed in 2 different laboratoria

Table IV. 28: Acute toxicity of pyridine to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
13 bacterial strains	-	S	ag	-	-	am	16 h	EC50	3300		Warne et al., 1989
crustacea											
Artemia salina, 2nd instar	-	S	98%	-	32 o/oo	am	24 h	LC50	1318		Foster & Tullis, 1984

Table IV. 29: Chronic toxicity of pyridine to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Chilomonas paramaecium	N	S	-	6.9	142	am	48 h	NOEC	3.9		Bringmann et al., 1980
Entosiphon sulcatum				6.9			72 h	NOEC	3.5		Bringmann, 1978
Uronema parduczi	N	S	-	6.9	142	am	20 h	NOEC	183		Bringmann & Kühn, 1980b
bacteriophyta											
Pseudomonas putida	N	S	-	7.0	60	am	16 h	NOEC	340		Bringmann & Kühn, 1976
cyanophyta											
Microcystis aeruginosa	N	S	-	7.0	60	am	8 d	NOEC	28		Bringmann & Kühn, 1978a,b
algae											
Chlorella pyrenoidosa	N	S	>98%	8.2	200	am	48 h	NOEC	150		Slooff et al., 1983
Scenedesmus pannonicus	N	S	-	8.2	200	am	48 h	NOEC	280		Slooff et al., 1983
Scenedesmus quadricauda	N	S	-	7.0	-	am	8 d	NOEC	120		Bringmann & Kühn, 1977b
Selenastrum capricornutum	N	S	>98%	8.2	200	am	96 h	NOEC	50		Slooff et al., 1983

Table IV. 30: Toxicity of pyridine to soil organisms

organism	soil type	pH	% om	% clay	temp [° C]	exp. time	criterion	result test soil [$mg/kg_{d.w.}$]	result stand. soil [$mg/kg_{d.w.}$]	note	reference
macrophyta											
Lactuca sativa	OECD	7.5	1.6	-	23	14d	NOEC	32	160	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.5	1.6	-	23	7 d	NOEC	10	50	a	Adema & Henzen, 1989
Lactuca sativa	OECD	7.8	1.4	12	20	14 d	EC50	203	1015	a	Hulzebos et al., 1993

a growth

Table IV. 31: Acute toxicity of tetrahydrofuran to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
crustacea											
Daphnia magna, 24 h	N	S	-	7.6	272	am	24 h	EC50	5930		Bringmann & Kühn, 1982
pisces											
Leuciscus idus melanotus	N	S	-	7-8	255	tap	48 h	LC50	2820, 2930		Juhnke & Lüdemann, 1978
Pimephales promelas	Y	S	99%	7.6	44.5	nw	96 h	LC50	2160		Brooke et al., 1984

Table IV. 32: Acute toxicity of tetrahydrofuran to marine species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
bacteriophyta											
Vibrio fisheri	-	S	-	-	-	am	15 min	EC50	908		Zhao & Wang, 1993

Table IV. 33: Chronic toxicity of tetrahydrofuran to fresh water species

organism	A	test type	test subst. purity	pH	hardness salinity [mg $CaCO_3$/l]	test water	exp. time	criterion	value [mg/l]	note	reference
protozoa											
Chilomonas paramaecium	N	S	-	6.9	142	am	48 h	NOEC	2868	b	Bringmann et al., 1980
Uronema parduczi	N	S	-	6.9	142	am	20 h	NOEC	858	b	Bringmann & Kühn, 1980b
bacteriophyta											
Pseudomonas putida	N	S	-	7.0	60	am	16 h	NOEC	580	b	Bringmann & Kühn, 1976
pisces											
Pimephales promelas, eggs	Y	F	>97%	7.7	45.2	nw	36 d	NOEC	216	a	Call et al., 1985
cyanophyta											
Microcystis aeruginosa	N	S	-	7.0	60	am	8 d	NOEC	225	a	Bringmann & Kühn, 1978a,b
algae											
Scenedesmus quadricauda	N	S	-	7.0	-	am	8 d	NOEC	3700	a	Bringmann & Kühn, 1977b

a growth
b cell multiplication inhibition

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