Attachment 9 Acceptable Toxicity Studies for the Selection of Bird Dietary Toxicity Reference Values

CHEMICAL	CHEMICAL FORM	TEST SPECIES	NOAEL (mg/kg bw/day)	LOAEL (mg/kg bw/day)	EXPOSURE ROUTE	EXPOSURE DURATION	ENDPOINT	ENDPOINT EFFECT	SOURCE
Metals and Trace Elements									
Arsenic	sodium arsenate	mallard	6.1	na	food	10 wks	growth, survival	female	Camardese et al. (1990)
Arsenic	sodium arsenate	mallard	10	40	food	115-128 days	reproduction	delayed egg laying; depressed egg weight and shell thinning; decrease offspring body weight and production	Stanley et al. (1994)
Arsenic	sodium arsenite	mallard - young	25	50	food	154 days	survival	survival	USFWS (1964)
Cadmium	cadmium chloride	mallard young (females)	1.5	na	food	12 wks	growth	body weight	Cain et al. (1983)
Cadmium	$CdSO_4*8H_2O$	leghorn hen	0.73	2.9	food	48 wks	reproduction	egg production, shell thickness	Leach et al. (1979)
Cadmium	cadmium chloride	Japanese quail (chicks)	na	4.0	food	6 wks	growth	male body weight	Richardson et al. (1974)
Cadmium	cadmium chloride	mallard	19	na	food	90 days	survival		White and Finley (1978a)
Cadmium	cadmium chloride	mallard	20	na	food	30-90 days	survival, growth	body weight, adult survival	White and Finley (1978b)
Cadmium	cadmium chloride	mallard	1.5	20	food	30-90 days	reproduction	egg production	White and Finley (1978b)
Cadmium	cadmium chloride	leghorn chicks	na	24	food	21 days	growth	male body weight	Freeland and Cousins (1973)
Cadmium	cadmium chloride	leghorn chicks	na	40	food	20 days	growth	male body weight	Pritzl et al. (1974)
Cadmium	cadmium chloride	mallard	16	na	food	42 days	growth	body weight	DiGiulio and Scanlon (1984)
Cadmium	cadmium chloride	mallard	na	47	food	42 days	growth	body weight	DiGiulio and Scanlon (1984)
Chromium	copper sulfate	white leghorn layers (hens)	0.10	na	food	28 days	reproduction	egg weight and shell thickness	Lien et al. (2004)

CHEMICAL	CHEMICAL FORM	TEST SPECIES	NOAEL (mg/kg bw/day)	LOAEL (mg/kg bw/day)	EXPOSURE ROUTE	EXPOSURE DURATION	ENDPOINT	ENDPOINT EFFECT	SOURCE
Chromium	chromium 3+ as $CrK(SO_4)_2$	black duck	1.0	5.0	food	10 mo (and critical lifestage)	reproduction	duckling survival	Haseltine et al. (unpublished)
Chromium	Na_2CrO_4	Nochols chicks	7.7	na	food	22 days	growth, survival	male adult survival, male body weight	Romoser et al. (1961)
Cobalt	cobalt chloride	broiler chicks	2.31[b]	23.1	food	14 days	growth	body weight, survival	Diaz et al. (1994)
Copper	copper sulfate, copper amino acid complex	broiler chicks	2.1	na	food	17 days	growth, survival	body weight, survival	Dozier et al. (2003)
Copper	copper sulfate (hydrous)	hisex-brown hens	11.2	na	food	90 days	reproduction, survival	damaged egg ratio, egg weight and survival	Balevi & Coskun (2004)
Copper	copper sulfate	chicks, day-old	16	29	food	25 days	growth	growth	Smith (1969)
Copper	copper sulfate	chicks	21	41	food	4 wks	growth	growth and gizzard erosion	Poupoulis and Jensen (1976)
Copper	copper chloride	chicks	na	66	food	8-22 days	growth	body weight	Persia et al. (2004)
Copper	copper oxide	chicks	47	62	food	10 wks	growth/ survival	growth, survival	Mehring et al. (1960)
Copper	copper sulfate	white leghorn layers (hens)	15	na	food	28 days	reproduction	egg weight and shell thickness	Lien et al. (2004)
Lead	lead nitrate	mallards, first-year	2.5	na	food	12 wks	survival	survival	Finley et al. (1976)
Lead	metallic lead powder	American kestrel	5.82	na	food	5-7 mo	survival/ reproduction	survival, fertility, egg production, eggshell thinning	Pattee (1984)
Lead	lead acetate	Japanese quail	2.0	20	food	12 wks	reproduction	egg hatchability	Edens et al. (1976)
Lead	lead acetate	Japanese quail (chicks)	5.5	28	food	6 wks	growth	body weight	Morgan et al. (1975)
Mercury	methylmercury chloride	great egret, one day old	0.0091[b]	0.091	food	14 wks	growth	Growth	Spalding et al. (2000)
Mercury	methylmercury chloride	mallard	0.50	na	food	>60 days	reproduction	eggshell thickness	Heinz (1980)
Mercury	methylmercury chloride	Japanese quail (chicks at hatching)	na	0.9	food	5 days	survival	hatchling survival (16%)	Hill and Soares (1987)
Mercury	methylmercury chloride	zebra finch	0.72	1.4	food	76 days	survival	Survival	Scheuhammer (1988)

Chemical	Chemical Form	Test Species	NOAEL (mg/kg bw/day)	LOAEL (mg/kg bw/day)	Exposure Route	Exposure Duration	Endpoint	Endpoint Effect	Source
Mercury	methylmercury chloride	northern bobwhite, 12 day old	0.43	1.6	food	6 wks	survival	Survival	Spann et al. (1986a)
Mercury	mercuric chloride	Japanese quail, one day old	0.80	1.6	food	10 wks	reproduction	eggshell thickness	Stoewsand et al. (1971)
Mercury	dimethyl mercury	American kestrel	5.24	na	food	3 mo	survival	eggshell thickness	Peakall and Lincer (1972)
Mercury	mercuric chloride	Japanese quail (chicks at hatching)	na	62	food	5 days	survival	hatchling survival (12%)	Hill and Soares (1987)
Molybdenum	sodium molybdate	chicken	6.0[a]	30	food	21 days	reproduction	embryonic viability	Lepore and Miller (1965)
Nickel	nickel sulfate	broiler chicks	15	na	food	4 wks	growth	body weight gain	Weber and Reid (1968)
Nickel	nickel sulfate	broiler chicks	na	33	food	4 wks	growth	reduced body weight	Weber and Reid (1968)
Nickel	nickel acetate	broiler chicks	17	na	food	4 wks	growth	body weight gain	Weber and Reid (1968)
Nickel	nickel acetate	broiler chicks	na	38	food	4 wks	growth	reduced body weight	Weber and Reid (1968)
Nickel	nickel sulfate	mallard	na	107	food	90 days	survival, growth	survival, body weight	Cain and Pafford (1981)
Nickel	nickel sulfate	mallard	77	na	food	90 days	survival, growth	survival, body weight	Cain and Pafford (1981)
Nickel	nickel sulfate	mallard	132	na	food	90 days	survival, growth, reproduction	adult survival; body weight; hatchling weight	Eastin and O'Shea (1981)
Selenium	sodium selenite	broiler chicks	0.025	na	food	~40 days	growth, survival	body weight	Choct et al. (2004)
Selenium	sel-plex 50	broiler chicks	0.025	na	food	~40 days	growth, survival	body weight	Choct et al. (2004)
Selenium	seleno-methionine	mallard	0.42	na	food	~100 days	reproduction	offspring growth/survival	Heinz et al. (1989)
Selenium	seleno-methionine	mallard	na	0.82	food	~100 days	reproduction	offspring growth/survival	Heinz et al. (1989)
Selenium	Na_2SeO_3	mallard	0.50	na	food	4 wks before laying to 3 wks after hatching	reproduction	embryo abnormalities	Heinz et al. (1987)

CHEMICAL	CHEMICAL FORM	TEST SPECIES	NOAEL (mg/kg bw/day)	LOAEL (mg/kg bw/day)	EXPOSURE ROUTE	EXPOSURE DURATION	ENDPOINT	ENDPOINT EFFECT	SOURCE
Selenium	Na_2SeO_3	mallard	na	1.0	food	4 wks before laying to 3 wks after hatching	reproduction	embryo abnormalities	Heinz et al. (1987)
Selenium	Na_2SeO_3	mallard	1.0	na	food	4 wks before laying to 3 wks after hatching	growth	adult growth	Heinz et al. (1987)
Selenium	seleno-methionine	mallard	1.6	na	food	~100 days	survival, growth	body weight; adult survival	Heinz et al. (1989)
Selenium	Na_2SeO_3	mallard	na	2.5	food	4 wks before laying to 3 wks after hatching	growth	adult growth	Heinz et al. (1987)
Selenium	seleno-methionine	screech owl	1.0	3.2	food	~ 3 mo	growth, reproduction	body weight, hatching success, 5 days survival, clutch size, egg size and mass	Wiemeyer and Hoffman (1996)
Selenium	Na_2SeO_3	mallard	4.6	na	food	42 days	survival		Heinz et al. (1988)
Selenium	Na_2SeO_3	mallard		4.6	food	42 days	growth	body weight	Heinz et al. (1988)
Selenium	Na_2SeO_3	mallard	2.1		food	42 days	growth	body weight	Heinz et al. (1988)
Selenium	Na_2SeO_3	mallard	na	10	food	4 wks before laying to 3 wks after hatching	survival	adult survival	Heinz et al. (1987)
Selenium	Na_2SeO_3	mallard	2.5	na	food	4 wks before laying to 3 wks after hatching	survival	adult survival	Heinz et al. (1987)
Selenium	Na_2SeO_3	mallard	na	10	food	42 days	survival		Heinz et al. (1988)
Thallium	thallium sulfate	pheasant	2.4[b]	24	oral gavage	max 14 days	survival	LD50	Hudson et al. (1984)
Thallium	thallium sulfate	mallard	na	37	oral gavage	max 14 days	survival	LD50	Hudson et al. (1984)
Vanadium	ammonium metavanadate	white leghorn hens	2.0	na	food	6 wks	reproduction	egg weight, egg quality	Davis et al. (2002)
Vanadium	ammonium metavanadate	white leghorn hens	1.2	2.3	food	4 wks	growth	body weight	Ousterhout and Berg (1981)
Vanadium	vanadium sulfate	mallard	11.4	na	food	12 wks	growth, survival	body weight, survival	White and Dieter (1978)
Zinc	copper sulfate, copper amino acid complex	broiler chicks	17	na	food	17 days	growth, survival	body weight, survival	Dozier et al. (2003)

Chemical	Chemical Form	Test Species	NOAEL (mg/kg bw/day)	LOAEL (mg/kg bw/day)	Exposure Route	Exposure Duration	Endpoint	Endpoint Effect	Source
Zinc	zinc oxide, zinc sulfate, or zinc carbonate	white rock chicks	82	124	food	5 wks	growth	growth	Roberson and Schaible (1960)
Zinc	zinc sulfate	white leghorn hens	133	na	food and supplements	44 wks	reproduction	egg hatchability	Stahl et al. (1990)
Zinc	zinc carbonate	mallard (7 wks old)	na	300	food	60 days	survival	survival, leg paralysis	Gasaway and Buss (1972)
Zinc	zinc acetate	Hubbard broiler chicks	330	659	food	5 wks	growth/ survival	survival, reduced growth	Oh et al. (1979)
Zinc	zinc chloride	chicks	na	344	food	8-22 days	growth	body weight	Persia et al. (2004)
Organometals									
Tributyltin	TBTO	Japanese quail	22.5	na	food	6 wks	growth	body weight	Schlatterer et al. (1993)
Tributyltin	TBTO	Japanese quail	1.4	3.6	food	6 wks	reproduction	no hatched eggs per pair	Schlatterer et al. (1993)
Tributyltin	TBTO	Japanese quail	1.4	3.6	food	6 wks	reproduction	embryo survival in shell, hatchability	Coenen et al. (1992)
PAHs									
Benzo(a)pyrene	benzo(a)pyrene	pigeons	0.28[a]	1.4	weekly intramuscular injection	5 mo	reproduction	fertility, ovarian appearance	Hough et al. (1993)
Benzo(a)pyrene	benzo(a)pyrene	white rock chicken	33	na	food	30 days	growth	body weight gain	Rigdon and Neal (1963)
PAHs	aromatic hydrocarbon mixture including individual PAHs	mallard	8	40	food	7 mo	growth	little change in body weight	Patton and Dieter (1980)
PAHs	petroleum hydrocarbon mixture including PAHs)	mallard	400	na	food	7 mo	survival	survival	Patton and Dieter (1980)
Phthalates									
Bis(ethylhexyl) phthalate	BEHP	ringed turtle-dove	1.45	na	food	4 wks	reproduction	eggshell thickness	Peakall (1974)
Bis(ethylhexyl) phthalate	BEHP	European starling	67.8	na	food	30 days	growth	growth, food consumption	O'Shea and Stafford (1980)
Bis(ethylhexyl) phthalate	BEHP	chicken	na	329	food	230 days	reproduction	cessation of egg laying, abnormal ovaries	Ishida et al. (1982)
PCBs									

CHEMICAL	CHEMICAL FORM	TEST SPECIES	NOAEL (mg/kg bw/day)	LOAEL (mg/kg bw/day)	EXPOSURE ROUTE	EXPOSURE DURATION	ENDPOINT	ENDPOINT EFFECT	SOURCE
PCBs (Aroclor 1248)	Aroclor 1248	American kestrel	na	0.35	food	5.5 mo	reproduction	eggshell weight and thickness	Lowe and Stendell (1991)
PCBs (Aroclor 1248)	Aroclor 1248	screech owl	0.49	na	food	2 generations	reproduction	eggshell thickness, egg production, hatching success, fledging success	McLane and Hughes (1980)
PCBs (Aroclor 1242)	Aroclor 1242	Japanese quail	na	0.60	food	45 days	reproduction	eggshell thinning	Hill et al. (1976)
PCBs (Aroclor 1254)	Aroclor 1254	ringed turtle-dove	na	1.4	food	2 generations	reproduction	hatching success in second generation	Peakall et al. (1972); Peakall and Peakall (1973)
PCBs (Aroclor 1254)	Aroclor 1254	mallard	2.5	na	food	~ 1 mo	reproduction	Reproductive success	Custer and Heinz (1980)
PCBs (Aroclor 1254)	Aroclor 1254	mallard	3.9	na	food	4 mo	reproduction	egg production, eggshell thinning	Risebrough and Anderson (1975)
PCBs (Aroclor 1248: 1254:1260 mixture)	1:1:1 ratio of Aroclor 1248:1254:1260	American kestrel	na	5 to 7	food	100 days until eggs hatched	reproduction	egg laying in second generation (exposed in ovo); also some effect on clutch size and fledgling success	Fernie et al. (2000; 2001)
PCBs (Aroclor 1248: 1254:1260 mixture)	1:1:1 ratio of Aroclor 1248:1254:1260	American kestrel	na	5 to 7	food	1 mo prior to pairing until anticipated egg hatching	reproduction	cracked eggs, embryo abnormalities;	Fernie et al. (2003b)
PCBs (Aroclor 1248: 1254:1260 mixture)	1:1:1 ratio of Aroclor 1248:1254:1260	American kestrel	na	7	food	100 days	reproduction	offspring survival and offspring body weight	Fernie et al. (2003a)
PCBs (Aroclor 1242)	Aroclor 1242	mallard	na	15	food	12 wks	reproduction	hatchability, embryo survival, egg viability, embryo abnormalities	Haseltine and Prouty (1980)
Pesticides									
Aldrin	aldrin	quail	0.008[a]	0.04	food	5 mo	survival	97.5% survival in 127 days	DeWitt (1956)
Aldrin	aldrin	pheasant	na	0.7	food	16-20 wks	survival	100% survival in 46 days	DeWitt (1956)
Aldrin	aldrin	pen-reared pheasant chicks	10	20	gelatin capsule	7 wks (+ 9 wks untreated)	growth	growth	Hall et al. (1971)
Aldrin	aldrin	pen-reared pheasant chicks	na	92	gelatin capsule	7 wks (+ 9 wks untreated)	survival	growth	Hall et al. (1971)

Chemical	Chemical Form	Test Species	NOAEL (mg/kg bw/day)	LOAEL (mg/kg bw/day)	Exposure Route	Exposure Duration	Endpoint	Endpoint Effect	Source
Chlordane	tech chlordane	bobwhite quail	0.6	na	food	10 wks	growth, survival	body weight, adult survival	Ludke (1976)
Chlordane	exp chlordane (HCS 3260)	bobwhites (juvenile)	na	20	food	5 days	survival	50% survival	Hill et al. (1975); Heath et al. (1972)
Chlordane	exp chlordane (HCS 3260)	Japanese quail	na	21	food	5 days	survival	50% survival	Hill et al. (1975); Heath et al. (1972)
Chlordane	exp chlordane (HCS 3260)	ring-necked pheasant	na	25	food	5 days	survival	50% survival	Hill et al. (1975); Heath et al. (1972)
Chlordane	exp chlordane (HCS 3260)	mallard-young	na	115	food	5 days	survival	50% survival	Hill et al. (1975); Heath et al. (1972)
DDT	p,p'-DDT	quail	0.03	0.15	food	26 wks+12 days	reproduction	eggshell thickness	Stickel and Rhodes (1970)
Total DDT	tech DDT	mallard	0.18	na	food	11 mo	reproduction	eggshell weight and thickness	Davison and Sell (1974)
DDT	p,p'-DDT	mallard	0.19	na	food	11 mo	reproduction	eggshell weight and thickness	Davison and Sell (1974)
DDE	"DDE"	barn owls	na	0.32	food	2 yrs (2 nestings)	reproduction	eggshell breakage/ thickness; nestling survival	Mendenhall et al. (1983)
DDE	"DDE"	barn owls	0.32	na	food	2 yrs (2 nestings)	survival	adult survival	Mendenhall et al. (1983)
DDE	"DDE"	American kestrel	na	0.35	food	14 days	reproduction	eggshell thinning, egg permeability	Peakall et al. (1973)
DDD	tech DDD	mallard	na	0.90	food	2 yrs	reproduction	hatchling survival, production	Heath et al. (1969)
DDE	p,p'-DDE	mallard	na	0.90	food	2 yrs	reproduction	% cracked, hatchling survival/production, shell thickness, embryonation	Heath et al. (1969)
DDE	p,p-DDE	black duck	na	1.0	food	7 mo	reproduction	shell thickness, egg weight, hatchability, duckling survival	Longcore and Samson (1973)
DDE	DDE	mallard	na	1.0	food	30 days	reproduction	eggshell thinning	Kolaja (1977)
DDE	DDE	black duck	na	1.0	food	reproductive period (through incubation and hatching)	reproduction	eggshell thinning and cracking, embryo survival, duckling survival	Longcore et al. (1971)
DDT	DDT	mallard	na	1.0	food	30 days	reproduction	eggshell thinning	Kolaja (1977)

Chemical	Chemical Form	Test Species	NOAEL (mg/kg bw/day)	LOAEL (mg/kg bw/day)	Exposure Route	Exposure Duration	Endpoint	Endpoint Effect	Source
DDE	p,p' DDE	American kestrel	na	1.0	food	1 yr (2 clutches)	reproduction	eggshell thickness	Wiemeyer and Porter (1970); Porter and Wiemeyer (1972)
Dieldrin	dieldrin	Japanese quail	0.06	na	food	4 generation	survival, growth, reproduction	adult survival, body weight, fertility, hatchability, egg product	Shellenberger (1978)
Dieldrin	dieldrin	mallard	0.063	na	food	24 days	growth, survival	body weight, leg length, adult survival	Nebeker et al. (1992)
Dieldrin	dieldrin	barn owl	0.066	na	food	2 yrs (2 nestings)	survival, reproduction	adult survival, eggshell breakage/ thickness, nestling survival, hatching success, clutch size	Mendenhall et al. (1983)
Dieldrin	dieldrin	quail	0.080	0.12	food	5 mo	survival	17% survival vs. 9% in control	DeWitt (1956)
Dieldrin	dieldrin	mallard	na	0.16	food	> 1 year	reproduction	eggshell thinning	Lehner and Egbert (1969)
Dieldrin	dieldrin	bobwhite quail	0.24	0.47	food	2 mo	survival		Fergin and Schafer (1977)
Dieldrin	dieldrin	white leghorn chicken	0.3	na	food	16 wks	reproduction	egg hatch, 14-day chick survival	Graves et al. (1969)
Dieldrin	dieldrin	mallard	0.49	na	food	11 mo	reproduction	eggshell weight and thickness	Davison and Sell (1974)
Dieldrin	dieldrin	Japanese quail	0.54	na	food	75 days	reproduction	eggshell thinning	Hill et al. (1975)
Dieldrin	dieldrin	Japanese quail	na	0.60	food	up to 18 wks	reproduction	fertility	Walker et al. (1969)
Dieldrin	dieldrin	pheasant	na	0.60	food	16-20 wks	survival	100% survival by 68 days	DeWitt (1956)
Dieldrin	dieldrin	white leghorn males	na	0.65	food	20 wks	survival		Ahmed et al. (1978)
Dieldrin	dieldrin	quail	na	0.80	food	16-20 wks	survival	100% survival by 76 days; 24% in control	DeWitt (1956)
Dieldrin	dieldrin	red-light Sussex hybrids	na	0.83	food	13 mo adults, 6 wks chicks	growth	body weight	Brown et al. (1974)
Dieldrin	dieldrin	red-light Sussex hybrids	0.83	na	food	13 mo	reproduction	chick survival	Brown et al. (1974)

CHEMICAL	CHEMICAL FORM	TEST SPECIES	NOAEL (mg/kg bw/day)	LOAEL (mg/kg bw/day)	EXPOSURE ROUTE	EXPOSURE DURATION	ENDPOINT	ENDPOINT EFFECT	SOURCE
Dieldrin	dieldrin	ring-necked pheasant	na	0.86	food	8 wks	reproduction	offspring survival, egg production	Genelly and Rudd (1956)
Dieldrin	dieldrin	mallard	na	0.92	food	11 mo	reproduction	eggshell weight and thickness	Davison and Sell (1974)
Dieldrin	dieldrin	mallard	0.92	na	food	11 mo	survival, growth	body weight, adult survival	Davison and Sell (1974)
Endosulfan	endosulfan	gray partridge	10	na	food	4 wks- during critical lifestage	reproduction	number of eggs; egg fertility, embryo and chick survival; eggs hatched	Abiola (1992)
Endrin	endrin	quail	0.070	na	food	5 mo	survival		DeWitt (1956)
Endrin	endrin	quail	na	0.20	food	16-20 wks	survival		DeWitt (1956)
Endrin	endrin	mallard	0.29	na	food	7 mo	growth	body weight	Spann et al. (1986b)
Endrin	endrin	mallard	0.29	na	food	7 mo	reproduction	egg weight and fertility, shell thickness, duckling survival/ body weight, clutch size, hatch	Spann et al. (1986b)
Endrin	endrin	mallard	na	0.30	food	12 wks	growth, reproduction	body weight; onset egg production, embryo survival	Roylance et al. (1985)
Endrin	endrin	screech owl	0.33	na	food	mating-incubation	growth	body weight	Fleming et al. (1982)
Endrin	endrin	screech owl	na	0.33	food	mating-incubation (crit. lifestage)	reproduction	fledglings produced, egg production, number of hatched eggs	Fleming et al. (1982)
Endrin	endrin	pheasant	na	0.60	food	16-20 wks	survival	100% survival	DeWitt (1956)
gamma-Hexachloro-cyclohexane (Lindane)	gamma HCH	domestic mallard	1.6	3.6	oral intubation	8 wks	reproduction	eggshell thickness, size, quality; clutch size	Chakravarty and Lahiri (1986); Chakravarty et al. (1986)
gamma-Hexachloro-cyclohexane (Lindane)	gamma HCH	domestic mallard	20	na	oral intubation	8 wks	survival, growth	survival, body weight	Chakravarty et al. (1986)
Heptachlor	exp chlordane (HCS 3260)	bobwhites (juvenile)	0.5[b]	5	food	5 days	survival	50% survival	Hill et al. (1975); Heath et al. (1972)
Heptachlor	exp chlordane (HCS 3260)	Japanese quail	na	6	food	5 days	survival	50% survival	Hill et al. (1975); Heath et al. (1972)
Heptachlor	exp chlordane (HCS 3260)	ring-necked pheasant	na	13	food	5 days	survival	50% survival	Hill et al. (1975); Heath et al. (1972)

CHEMICAL	CHEMICAL FORM	TEST SPECIES	NOAEL (mg/kg bw/day)	LOAEL (mg/kg bw/day)	EXPOSURE ROUTE	EXPOSURE DURATION	ENDPOINT	ENDPOINT EFFECT	SOURCE
Heptachlor	exp chlordane (HCS 3260)	mallard-young	na	104	food	5 days	survival	50% survival	Hill et al. (1975); Heath et al. (1972)
Hexachlorobenzene	HCB	Japanese quail	1.1	na	food	90 days	reproduction	hatchability	Vos et al. (1971)
Hexachlorobenzene	HCB	Japanese quail	1.1	na	food	90 days	survival		Vos et al. (1971)
Hexachlorobenzene	HCB	Japanese quail	1.2	na	food	90 days	growth	body weight	Schwetz et al. (1974)
Hexachlorobenzene	HCB	Japanese quail	na	1.2	food	90 days	reproduction	chicks hatched and survival	Schwetz et al. (1974)
Hexachlorobenzene	HCB	Japanese quail	na	4.5	food	90 days	reproduction	hatchability	Vos et al. (1971)
Hexachlorobenzene	HCB	Japanese quail	na	5	food	90 days	survival		Vos et al. (1971)
Methoxychlor	technical methoxychlor	zebra finch (chicks at 5-11 days old)	34.6	346	oral gavage	1 wks	reproduction	number of eggs hatched, broken/missing eggs	Gee et al. (2004)
Methoxychlor	methoxychlor	zebra finch chicks	34.6	346	oral gavage	1 wks	survival	survival	Millam et al. (2002)
Methoxychlor	technical methoxychlor	bobwhites (juvenile), Japanese quail, ringed-necked pheasant, mallard (young)	831	na	food	5 days	survival	survival	Hill et al. (1975); Heath et al. (1972)

[a] NOAEL estimated using an uncertainty factor of 5 (chronic LOAEL to chronic NOAEL).

[b] NOAEL estimated using an uncertainty factor of 10 (acute/subchronic LOAEL to chronic NOAEL).

LOAEL – lowest-observed-effect concentration

na – not available

NOAEL – no-observed-effect concentration

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

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