



Sources of chemicals in the Silent Spring Institute Household Exposure Study

Chemical	Abbreviation	What is the source... How is it used?
Pesticides		
4,4'-DDD	DDD	Breakdown product of DDT; former insecticide; no longer registered for any use in United States. See 4,4'-DDT.
4,4'-DDE	DDE	Breakdown product of DDT. See 4,4'-DDT
4,4'-DDT	DDT	Former insecticide (tobacco, cotton); disease control (malaria, typhus, and other insect transmitted diseases); January 15, 1971 and July 7, 1972 all DDT product uses cancelled except: 1) control of vector diseases by US Public Health Services; 2) health quarantine by military or US Department of Agriculture; 3) body lice control by physician prescription.
alachlor	Alach	Selective systemic herbicide (grasses, corn, sorghum, soybeans, peanuts, cotton, beans, beets, radishes, oilseed rape, brassicas, cabbage, ornamentals, peanuts, peas, potatoes, sugarcane, sunflowers, and tobacco).
bendiocarb	Bendio	Insecticide (cockroaches, soil insects, mosquitoes, flies, wasps, ants, fleas); all bendiocarb products voluntarily cancelled as of December 31, 2001. ¹
carbaryl	Carb	Insecticide (corn, alfalfa, livestock, poultry); non-agricultural uses (house, gardens, lawn); molluscicide; veterinarian medication; former use (sewage treatment plants); registered for use in the United States. Trade name is Sevin.
alpha-chlordane	achlor	Insecticide (fire ant control in power transformers); former insecticide uses (vegetables, underground termite control, lawns, and fruit); 1983 all uses banned except underground termite control that was banned in 1987. The only permitted current use is for fire ant control in power transformers. ²
gamma-chlordane	gchlor	Insecticide. See alpha-chlordane.
chlorothalonil	Chorth	Fungicide (vegetable crops, peanuts, and lawns); bactericide, nematocide, paint, and adhesive preservative.
chlorpyrifos	Chlpy	Insecticide (ticks, soil pests, mosquitoes, other household pests, animal houses, stored products, foliage, corn, alfalfa, cotton, sorghum, citrus, deciduous fruits and nuts).
3,5,6-trichloro-2-pyridinol	356TCPy	Breakdown product of chlorpyrifos.
cypermethrin	Cyper	Insecticide (mosquitoes, cockroaches, houseflies, and other public health pests); veterinarian medication.
diazinon	Diaz	Insecticide (over-the-counter ant and roach sprays, garden and lawn sprays) agricultural use (almonds, plums, peaches, walnuts, lettuce, nectarines, sweet corn, tobacco, apples, and other citrus); product sales for indoor use will stop in December 2002 while sales of products for outdoor use ends December 2004. ³
dicofol (ketone form)	Dico	Insecticide (mite control on fruit, vines, ornamentals, vegetables, field crops, in and around agricultural and domestic buildings); registered for use in the United States except for household use. ⁴
dieldrin	Dield	Former insecticide (malaria, locusts, termites, corn, and citrus); termite-proofer (plastic and

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		rubber electrical coverings, telecommunication cables, plywood and other building construction); timber preservation; 1974 EPA restricted its use to termite control by direct soil injection, non-food seed and plant treatment; and nonagricultural applications; not registered for current use in the United States.
heptachlor	Hept	Former insecticide (control cotton boll weevil, termites, and grubs in field crops, citrus, foliage, pineapples, pest control operators, vegetables, and nut crops); repellent spray (flies, fleas, and mosquitoes); Most registered uses were cancelled in 1978. No current registrations. ⁵
Lindane	Lind	Former insecticide (plant-eating and soil-inhabiting insects, public-health pets, scabies mites, lice, and animal skin parasites, crops, and seed treatments); indoor animal treatment (sprays, dips, and dust); rodent control (baits and see treatments). Currently no uses are registered with the EPA. ⁶
malathion	Malth	Insecticide (fruit flies and mosquitoes in poultry, home, garden, lawn, cotton, citrus, corn, sorghum, fruits, nuts, wheat, potatoes, rice, and storage bins); transportation equipment; acaricide; public health medication (parasites of cattle, poultry, dogs, cats, human head and body lice, household insects, and stored grain); registration currently being reviewed by the EPA ⁷ .
methoxychlor	MX	Former insecticide (flies, mosquitoes, and other pests in cattle, goats, sheep, pigs, fruit and shade trees, vegetables, vines, flowers, and in forestry; DDT replacement in animal houses, dairies, homes, and industrial premises (except poultry houses); use cancelled by the EPA in 2002. ⁸
methyl parathion	MePthion	Insecticide (controls boll weevils, aphids, plant lice, thrips, and other chewing and sucking insects in rice, fruit, vegetables, and other crops); acaricide; registration currently being reviewed by the EPA ⁹ .
pentachlorophenol	PCPh	Insecticide (termites and snails); herbicide (general); molluscicide; fungicide (protect wood, textiles, pulp and paper from fungal decay and wood-boring insects); bactericide (drilling fluids); fermentation inhibitor; preharvest defoliant (cotton); algicide; preservative (wood, wood products, starches, dextrans, glues); germicide (trays in mushroom houses); no longer available for over-the-counter sale in the United States but currently registered for use in United States pending pre-Reregistration Eligibility Decision by the EPA. ¹⁰
cis-permethrin	cPerm	Insecticide (forest protection, mosquitoes, body lice, cattle); nematocide; acaricide; wood preservative; tick repellent; medication; veterinarian medication; registered for use in the United States ¹¹ .
trans-permethrin	tPerm	Insecticide; see cis-permethrin.
o-phenylphenol	oPP2, oPP1	Fungicide (post harvest citrus and vegetable to protect against microbial damage); germicide; fumicide; household disinfectant (cutting oils, timber, and paper); preservative (water-oil emulsions, metal working fluids, leather, and paint); rubber industry; plasticizer; and intermediate (dyes); currently registered for use in United States pending pre-Reregistration Eligibility Decision by the EPA. ¹²
piperonyl butoxide	PIPBO	Insecticide synergist (enhances the insecticidal properties of pyrethrins); medication;

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		currently registered for use in United States pending pre-Reregistration Eligibility Decision by the EPA. ¹³
prometon	Prom	Non-selective systemic herbicide (non-crop annual and perennial broad-leaved weeds, grasses and brush weeds).
propoxur	PrPx	Insecticide (cockroaches, ants, hornets, flies, mosquitoes, wooly aphids, bugs, and leaf hoppers); molluscicide; veterinarian medication.
trifluralin	Trifl	Herbicide
Alkylphenols		
4-nonylphenol	NP	Surfactant (detergents, paints, emulsifiers, pesticides, and herbicides) ¹⁴ .
nonylphenol monoethoxylate	NP1EO	See 4-nonylphenol.
nonylphenol diethoxylate	NP2EO	See 4-nonylphenol.
nonylphenol ethoxycarboxylate	NP1EC	See 4-nonylphenol.
4-octylphenol	4OP	Chemical intermediate (resins, fungicides, bactericides, dyes, adhesives, and rubber chemicals); surfactant, plasticizer, antioxidant, and fuel oil stabilizer.
octylphenol monoethoxylate	OP1EO	See 4-octylphenol.
octylphenol diethoxylate	OP2EO	See 4-ocylphenol.
Phthalates		
diethyl phthalate	DEP	Solvent (varnishes); fixative (perfumes); plasticizer (solid rocket propellants, polystyrene plastics); dispersant (dye carrier); wetting agent, camphor substitute, and mosquito repellent; suitable for food packaging.
di-n-butyl phthalate	DBP	Plasticizer (lacquers, elastomers, explosives, nail polish, and solid rocket propellants); solvent (perfumes, resins, inks); textile lubricant, safety glass, paper coatings, adhesives; Former insecticide.
benzyl butyl phthalate	BBP	Chemical intermediate and plasticizer (polyvinyl chloride-based flooring products, adhesives, plastics, and automobile coatings).
bis(2-ethylhexyl) phthalate	DEHP	Plasticizer (resins and rubber); solvent (inks); PCB replacement (dielectric fluids for electric capacitors); defoamer (paper manufacturing); chemical intermediate (insect repellent); cosmetics, rubbing alcohol, liquid soap, detergents, lacquers, munitions, industrial lubricant.
dicyclohexyl phthalate	DCP	Plasticizer (synthetic resins); paper finisher; water resistant ink.
bis(2-ethylhexyl)adipate	DEHA	Plasticizer (meat-wrapping operations); blended with other phthalate plasticizers (polyvinyl polymers); solvent (bath oils, eye shadow, cologne, foundations, blush, nail-polish remover, moisturizers, and self tanning preparations); aircraft lubricant.

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di-n-propyl phthalate	DPP	Plasticizer ; laboratory use. Drug/therapeutic use.
diisobutyl phthalate	DIBP	Plasticizer
di-n-hexyl phthalate	DHP	Plasticizer (cellulose and vinyl plastics).
Parabens		
butyl paraben	BuPa	Preservative (food and antiseptic creams); antifungal agent.
ethyl paraben	EtPa	Preservative (food, pharmaceuticals, cosmetics, and adhesives).
methyl paraben	MePa	Antimicrobial additive (baked goods, beverages, creams, pastes, jams, jellies, syrups, and cosmetics).
Polycyclic Aromatic Hydrocarbons		
anthracene	Anth	Combustion by-product (coal tar, diesel exhaust, paving, and charcoal grilling).
pyrene	Pyr	See anthracene.
benz(a)anthracene	BaA	See anthracene.
benzo(a)pyrene	BaP	See anthracene.
Polychlorinated Biphenyls (PCBs)		
PCB 52	PCB52	Former open uses (hydraulic fluids, plasticizers, adhesives, fire retardants, wax extenders, dedusting agents, pesticide extenders, inks, lubricants, cutting oils, in heat transfer systems, and carbonless reproducing paper; former closed uses (closed electrical capacitors, electrical transformers, vacuum pumps, gas-transmission turbines; 1977 ban on open uses; 1984 ban on closed uses. ¹⁵
PCB 105	PCB105	See PCB 52.
PCB 153	PCB153	See PCB 52.
Flame Retardants		
PBDE 47	PBDE47	Flame retardant used in polyurethane foam for furniture, upholstery, insulation panels, and wood imitations. Also used in circuit boards and coatings for electrical equipment, military applications, and construction panels. ¹⁶
PBDE 99	PBDE99	See PBDE 47.
PBDE 100	PBDE100	See PBDE 47.
2,3-dibromo-1-propanol	23DB1P	Chemical intermediate (flame retardants tris(1,2,3-dibromopropyl) phosphate (Tris),

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tris(1,2,3-dibromopropyl) phosphate	Tris, TrisN, Tris LC	insecticides, and pharmaceuticals). Flame retardant formerly used for synthetic textiles and plastics. Also recommended for use in phenolic resins, paints, paper coatings, and rubber. In 1977, the Consumer Product Safety Commission (CPSC) banned the use of TRIS in children's clothing and in fabric, yarn, and fiber when intended for use in such clothing. No longer used in the US.
Phenols & Miscellaneous		
2,4-dihydroxybenzophenone	24dwbzon	Sunscreen agent; and ultraviolet absorber (polymers).
3-biphenylol	MPPh	No information available.
4,4'-biphenyldiol	44BPh	No information available.
4,4'-methylenediphenol	44MDPh	No information available.
4-cumylphenol	4CPh	No information available.
4-tert-butylphenol	4tBPh	Chemical intermediate (germicides). ¹⁷
bisphenol A	BPA	Fungicide; chemical intermediate (polyester, epoxy, phenoxy, and polysulfone resins, polycarbonate, and hydroquinone production); flame-retardants; rubber chemicals.
p-phenylphenol	pPhPh	Chemical intermediate (resins, rubber, and dyes); laboratory reagent; fungicide.
2,4-dichlorophenol	24DCPh	Chemical intermediate (mothproofing, antiseptics, seed disinfectants, miticide, pentachlorophenol, 2,4-D, and 2-(2,4-dichlorophenoxy)propionic acid (2,4-DP); other organic synthesis (dyestuffs)). Breakdown product of several pesticides.
4-nitrophenol	4NPh	Chemical intermediate (insecticides ethyl and methyl parathion, sulfur dyes, leather preservatives, and acetaminophen); indicator (0.1% alcohol solutions); substrate analyzer (UDP-glucuronyl transferase); fungicide; bactericide; breakdown product of several pesticides including nitrofen, methyl parathion, parathion, and others.
Urinary Analytes - Phthalates		
mono-ethyl phthalate	MEP	Breakdown product of diethyl phthalate. See Phthalates.
mono-n-butyl phthalate	MBuP	Breakdown product of di-n-butyl phthalate and benzyl butyl phthalate. See Phthalates.
mono-isobutyl phthalate	MIPB	
mono-benzyl phthalate	MBzP	Breakdown product of benzyl butyl phthalate. See Phthalates.
mono-(2-ethyl)-hexyl phthalate	MEHP	Breakdown product of bis (2-ethylhexyl) phthalate. See Phthalates.
mono-2-ethyl-5-hydroxyhexyl phthalate	MEHHP	Breakdown product of bis (2-ethylhexyl) phthalate (DEHP). See Phthalates.

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mono-2-ethyl-5-oxohexyl phthalate	MEOHP	Breakdown product of bis (2-ethylhexyl) phthalate (DEHP). See Phthalates.
mono-2-ethyl-5-carboxypentyl phthalate	MECPP	Breakdown product of bis (2-ethylhexyl) phthalate (DEHP). See Phthalates.
mono-3-carboxypropyl phthalate	MCPP	Breakdown product of bis (2-ethylhexyl) phthalate (DEHP). See Phthalates.
mono-methyl phthalate	MMP	Breakdown product of dimethyl phthalate used in solid rocket propellants, lacquers, plastics, safety glasses, rubber coating agents, molding powders, insect repellants, and pesticides. ¹⁸
mono-isononyl phthalate	MINP	Breakdown product of diisononyl phthalate, a plasticizer (adhesives); in coatings (vinyl swimming pools, furniture, car vinyl seats, jackets, raincoats, and boots; perfumes, and cosmetics.
mono-n-octyl phthalate	MOP	Breakdown product of di-n-octyl phthalate, a plasticizer (resins, plastics, and rubber materials); dye carrier, film, wire, cables, and adhesives.
mono-cyclohexyl phthalate	MCHP	Breakdown product of dicyclohexyl phthalate. See Phthalates.
Urinary Analytes- Pesticides		
1-naphthol	1Naph	Breakdown product of pesticides including carbaryl (see Pesticides) and naphthalene, a chemical intermediate (various organics, dyes, insecticides, tanning chemicals, and surfactants); ingredient (mothball repellants and toilet bowl deodorizers); worming medicine; and wood preservative.
2-naphthol	2Naph	Breakdown product of pesticides including naphthalene, a chemical intermediate (various organics, dyes, insecticides, tanning chemicals, and surfactants); ingredient (mothball repellants and toilet bowl deodorizers); intestinal vermifuge; and wood preservative.
3,5,6-trichloro-2-pyridinol	356TCPy	See entry in Pesticides.
2-isopropoxyphenol	IPP	Breakdown product of propoxur. See Pesticides.
2,4-dichlorophenol	24DCP	See entry in Phenols and Miscellaneous.
2,5-dichlorophenol	25DCP	Breakdown product of the disinfectant para-dichlorobenzene, a chemical intermediate (dyes, pharmaceutical, and agricultural); insecticide (clothes moths, fruit borers, and ants); fumigant (pig stalls); germicide (garbage, restrooms); extreme pressure lubricant; additive (resin-bonded abrasive wheels); control mildew and mold (leather and fabrics).
2,4,5-trichlorophenol	245TCP	Breakdown product of pesticides including pentachlorophenol. See Pesticides.
2,4,6-trichlorophenol	246TCP	Breakdown product of pesticides including pentachlorophenol, lindane (see Pesticides) and hexachlorobenzene, a raw material for synthetic rubber; a chemical intermediate (dyes, hexafluorobenzene, pentachlorophenol); fungicide (seed treatment of wheat, sunflower, and safflower).
pentachlorophenol	PCP	See entry in Pesticides.

Chemical	Abbreviation	What is the source... How is it used?
4-nitrophenol	PNP	See entry in Phenols and Miscellaneous (4NPh).
o-phenylphenol	OPP	See entry in Pesticides (oPP1, oPP2).
carbofuranphenol	CFP	Breakdown product of benfuracarb, carbofuran, and carbosulfan, insecticides.
2,4-dichlorophenoxyacetic acid	24D	Herbicide used to control broad- leaf weeds and woody plants in pastures and rangelands; agricultural use; industrial/commercial uses; along roadsides; lawns, turf, and aquatic uses; and as component of herbicide for jungle defoliation, Agent Orange (former use).

Notes:

Information from Hazardous Substance Databank (HSDB) manufacturing/use information section unless otherwise noted (on-line search 2002, 2004)

* Estimated consumption for alkylphenol ethoxylates

DINP = Diisononyl phthalate

PCB = Polychlorinated biphenyls

PCP = Pentachlorophenol

USEPA/OPP = United States Environmental Protection Agency/Office of Pesticide Protection

¹ U.S. Environmental Protection Agency. Reregistration Eligibility Decision for Bendiocarb Factsheet. 1999. <http://www.epa.gov/oppsrrd1/REDs/factsheets/0409fact.pdf>

² U.S. Environmental Protection Agency. Technical Factsheet on Chlordane. 2002. <http://www.epa.gov/OGWDW/dwh/t-soc/chlordan.html>

³ U. S. Environmental Protection Agency. Diazinon Interim Reregistration Eligibility Decision Facts. 2003

http://www.epa.gov/oppsrrd1/REDs/factsheets/diazinon_ired_fs.htm

⁴ Federal Register: March 3, 1999 (Volume 64, Number 41) Notices Page 10296-10299 <http://www.epa.gov/EPA-PEST/1999/March/Day-03/p5240.htm>

⁵ U.S. Environmental Protection Agency <http://www.epa.gov/oppsrrd1/REDs/factsheets/0175fact.pdf>

⁶ U.S. Environmental Protection Agency. Lindane Reregistration Eligibility Decision Facts. http://www.epa.gov/oppsrrd1/REDs/factsheets/lindane_fs.htm

⁷ U.S. Environmental Protection Agency. Pesticide Registration Status. Viewed May 2004. <http://cfpub.epa.gov/oppref/rereg/status.cfm?show=rereg>

⁸ Federal Register: July 17, 2002 (Volume 67, Number 137) Rules and Regulations Page. 46906-46909 Methoxychlor, Tolerance Revocations

<http://www.epa.gov/fedrgstr/EPA-PEST/2002/July/Day-17/p17873.htm>

⁹ U.S. Environmental Protection Agency. Pesticide Registration Status. Viewed May 2004. <http://cfpub.epa.gov/oppref/rereg/status.cfm?show=rereg>

¹⁰ *ibid.*

¹¹ *ibid.*

¹² *ibid.*

¹³ *ibid.*

¹⁴ Khim, J., Villeneuve DL, Kannan K, Lee KT, Snyder SA, Koh CH, Geisy JP. Alkylphenols, polycyclic aromatic hydrocarbons, and organochlorines in sediment from Lake Shihwa, Korea: instrumental and bioanalytical characterization. *Environmental Toxicology and Chemistry*, 1999. **18**(11): p. 2424-2432

¹⁵ IARC (International Agency for Research on Cancer). 1979. Some Halogenated Hydrocarbons. IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Humans, vol. 20. Lyon, France: International Agency for Research on Cancer. 609 pp.

¹⁶ ATSDR (Agency for Toxic Substances and Disease Registry). 2002. Toxicological Profile for Polybrominated Biphenyls and Polybrominated Diphenyl Ethers (PBBs and PBDEs). Draft for Public Comment. U.S. Department of Health and Human Services, Public Health Service. September. <http://www.atsdr.cdc.gov/toxprofiles/tp68-c5.pdf>

¹⁷ Gosselin RE, Smith RP, Hodge HC, Braddock JE eds. Clinical toxicology of commercial products: Acute poisoning. 1984. Williams and Wilkins Co., Baltimore.

¹⁸ U.S. Environmental Protection Agency. *Health and Environmental Effects Profile for Phthalate Acid Alkyl, Aryl, and Alkyl/Aryl Esters*. ECAO-CIN-P188. Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, Office of Research and Development, Cincinnati, OH. 1987.