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1,2,3,4,5-pentachlorobenzene; Pentachlorobenzene; PCB; PeCB; QCB; quintochlorobenzene :

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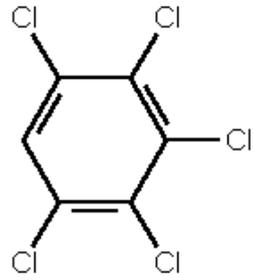
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pentachlorophenol (PCP), 2,3,4,5- :

tetrachlorophenol (TCP), mercaptotetrachloro-phenol (MTCP), the glucuronide derivative of pentachlorothiophenol (PCTP), and the minor metabolites tetrachlorohydroquinone (TCHQ), methylthiotetrachlorophenol (MeTTCP),

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- Aarnoutse PJ, De Jong APJM, Beurskens JEM. Analysis of dichloro benzene in porewater and sediment from the lake 'Ketelmeer' [in Dutch]. Bilthoven, the Netherlands: RIVM, 1996. Report 502501041.
- Adrian L, Görisch H. Microbial transformation of chlorinated benzenes under anaerobic conditions. *Research in Microbiology* 2002;153:131-137.
- Åkerblom N (2007) The importance of Sorption and Uptake Routes. Ph D Thesis University of Uppsala
- Aracil I, Font R, Conesa JA. (2005) Semivolatile and volatile compounds from the pyrolysis and combustion of polyvinyl chloride. *J. Anal and Appl Pyrolysis* 74:465-478
- ATSDR (2007). The Agency for Toxic Substances and Disease Registry. <http://www2.atsdr.cdc.gov/gsql/sitecontam.script>, http://www2.atsdr.cdc.gov/gsql/getsite.script?in_cas=000608-93-5
- Banerjee S, Sugatt RH, O'Grady DP. 1984. A simple method for determining bioconcentration parameters of hydrophobic compounds. *Environ. Sci. Technol.* 18, (2), 79-81.
- Barrows ME, Petrocelli SR, Macek KJ, Carroll JJ. 1980. Bioconcentration and elimination of selected water pollutants by bluegill sunfish (*Lepomis macrochirus*). In: Haque R, ed. Dynamics, exposure and hazard assessment of toxic chemicals. Ann Arbor, Michigan, U.S.A.: American Chemical Society. p. 379-392.
- Belfroid, A., van der Aa, E. and Balk, F. 2005. Addendum to the risk profile of Pentachlorobenzene. Royal Haskoning report 9R5744.01/R0005/ABE/CKV/Nijm.
- Beurskens JEM, Dekker CGC, Jonkhoff J, Pompstra L. Microbial dechlorination of hexachlorobenzene in a sedimentation area of the Rhine River. *Biogeochemistry* 1993;19:61-81.
- Beurskens JEM, Dekker CGC, Van den Heuvel H, Swart M, De Wolf J, Dolfing J. Dechlorination of chlorinated benzenes by an anaerobic microbial consortium that selectively mediates the thermodynamic most favorable reactions *Environmental Science & Technology* 1994;28:701-706.
- Boer, J. de, Van der Zande, T.E., Pieters, H., Ariese, F., Schipper, C.A., van Brummelen, T. Vethaak, A.D., 2001. Organic contaminants and trace metals in Flounder liver and sediment from the Amsterdam and Rotterdam harbours off the Dutch coast. *J Environ Monitoring* Aug;3(4):386-393.
- Borghini F, Joan O. Grimalt, Juan C. Sanchez-Hernandez and Roberto Bargagli. 2005. Organochlorine pollutants in soils and mosses from Victoria Land (Antarctica). *Chemosphere* 58: 271-278.
- Beck J, Hansen K. The degradation of Quintozene, Pentachlorobenzene, Hexachlorobenzene and Pentachloroaniline in soil. *Pesticide Science* 1974;5:41-48.
- Bro-Rasmussen F, Noddegaard E, Voldum-Clausen K. Comparison of the disappearance of eight Organophosphorus insecticides from soil in laboratory and in outdoor experiments. *Pesticide Science* 1970;1:179-182.
- Calambokidis, J, Jeffries, S, Ross PS and Ikonomou M. (1999). Temporal trends in contaminants in Puget sound harbor seals. US EPA and Puget Sound Water Quality Action Team.
- Cornelissen G, Gustafsson Ö. The role of environmental black carbon in sediment sorption and bioavailability. Stockholm: Institute for Applied Environmental Research (ITM), Stockholm University, 2004. http://ipimar-iniap.ipimar.pt/Vale/oral_20presentations_204.pdf
- Carlson AR, Kosian PA. 1987. Toxicity of chlorinated benzenes to fathead minnows (*Pimephales promelas*). *Arch. Environ. Contam. Toxicol.*; 16, 129-135.:
- Chaisuksant Y, Yu Q, Connell DW. 1997. Bioconcentration of bromo- and chlorobenzenes by fish (*Gambusia affinis*). *Water Res* 31: 61-68.
- CHEMFATE Database; Environmental Fate Data Base (EFDB) at Syracuse Research Centre. Available at: <http://www.syrres.com/esc/efdb.htm>
- Corsolini, S., Covaci, A., Ademollo, N., Focardi, S., Schepens, P. 2006. Occurrence of organochlorine pesticides (OCPs) and their enantiomeric signatures, and concentrations of polybrominated diphenyl ethers (PBDEs) in the Adélie penguin food web, *Antarctica Environ Pollution* 140(2): 371-382.

Den Besten C, Bennik MMH, Van Iersel M, Peters MAW, Teunis C, van Bladeren PJ. 1994. Comparison of the urinary metabolite profiles of hexachlorobenzene and pentachlorobenzene in the rat. *Chem Biol Interact* 90:121-137.

Environment Canada 2005. Risk management strategy for Pentachlorobenzene (QCB) and tetrachlorobenzenes (TeCBs). Available at: http://www.ec.gc.ca/Toxics/docs/substances/certToxics/rms/EN/CBz_RMS_E_05-01-05.pdf

European Chemicals Bureau (2007). ESIS (European Substances Information System). <http://ecb.jrc.it/esis/>
 Accessed on March 22.

http://ec.europa.eu/food/plant/protection/evaluation/existactive/list1-19_en.pdf

European Commission. (2007). Community Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants. SEC(2007)341.

http://www.pops.int/documents/implementation/nips/submissions/SEC_2007_341.pdf

Gabrielsen, G.W., Knudsen, L.B., Verreault, J., Pusk, K., Muir, D.C., Letcher, R.J., 2004. Halogenated organics contaminants and metabolites in blood and adipose tissue of polar bears (*Ursus maritimus*) from Svalbard. SFT project 6003080. Norsk Polar Institut. SPFO report 915/2004.

Geyer H, G. Politzki, D. Freitag. 1984. Prediction of ecotoxicological behaviour of chemicals: Relationship between n-octanol/water partition coefficient and bioaccumulation of organic chemicals by alga *Chlorella*. *Chemosphere*, 13, (2), 269-284.:

Gobas FAPC, McNeil EJ, Lovett-Doust L, Haffner GD. 1991. Bioconcentration of chlorinated aromatic hydrocarbons in aquatic macrophytes. *Environ Sci Technol* 25: 924-929.

Government of Canada. 1993. Canadian Environmental Protection Act Priority Substances List Assessment Report: Pentachlorobenzene. Environment Canada and Health Canada, Ottawa, Ontario. 32 pp. Available at:

http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/psl1-lspl1/pentachlorobenzene/index_e.html

Government of Canada (2003). Follow-up Report on Five PSL1 Substances for Which There Was Insufficient Information to Conclude Whether the Substances Constitute a Danger to the Environment 1,2-Dichlorobenzene, 1,4-Dichlorobenzene, Trichlorobenzenes, Tetrachlorobenzenes, Pentachlorobenzene. Available at:

http://www.ec.gc.ca/substances/ese/eng/psap/assessment/PSL1_chlorobenzenes_followup.pdf

Grimalt, JO, F Borghini, JC Sanchez-Hernandez, R Barra, CJ Torres Garcia, S Focardi. 2004. Temperature Dependence of the distribution of Organochlorine compounds in the mosses of the Andean Mountains. *Environ. Sci. Technol.* 38: 5386-5392.

Gustafson, DL, Long ME, Thomas RS, Benjamin SE, Yang RSH. 2000. Comparative hepatocarcinogenicity of hexachlorobenzene, pentachlorobenzene, 1,2,4,5-tetrachlorobenzene, and 1,4-dichlorobenzene: application of a medium-term liver focus bioassay and molecular and cellular indices. *Toxicol. Sci.* 53: 245-252

Hesse JM, Speijers GJA, Taalman RDFM (1991). Appendix to Report no. 710401005 Integrated criteria document chlorobenzenes. Effects. RIVM, Appendix to Report no. 710401005.

Hoogen G Van, Opperhuizen A. 1988. Toxicokinetics of chlorobenzenes in fish. *Environ. Toxicol. Chem.* 7, 213-219.

Hoydal, K, Dam, M (2003) AMAP Greenland and the Faroe Islands 1997-2001. Vol. 3: The Environment of the Faroe Islands. DANCEA, Danish Cooperation for Environment in the Arctic Ministry of Environment.

HSDB (2003). U.S. National Library of Medicine, Hazardous Substances Data Bank, HSDB. Information on pentachlorobenzene.

<http://toxnet.nlm.nih.gov/cgi-bin/sis/search/r?dbs+hsdb:@term+@rn+@rel+608-93-5>

Hulzebos EM, Adema, DMM, Dirven-Van Breemen EM, Henzen, L, Van Dis WA, Herbold HA, Hoekstra JA, Baerselman R and Van Gestel CAM. (1993). Phytotoxicity studies with *Lactuca sativa* in soil and nutrient solution. *Env. Toxicol. Chem.* 12: 1079-1094.

ICCA/WCC, International Council of Chemical Associations/World Chlorine Council (2007). ICCA-WCC Submission for PeCB & All Risk Profiles for the POPs Review Committee of the Stockholm Convention including annexes.

IUPAC-NIST solubility database. Available at: <http://srdata.nist.gov/solubility/>

Johnston JJ, Furcolow CA, Kimball BA. 1997. Identification of Metabolites of Pentachlorobenzene and 1,2,4,5-Tetrachlorobenzene in Coyote Feces: Development of Physiological Markers for Wildlife Damage Control. *Pestic. Sci.* 1997, 50, 249-257

Kaj, L., Dusan, B., 2004. Screening av Organiska Moljoegidter I Fisk-HCBD och Klorenbensener. (Screening of organics environmental toxins-HBCD and chlorobenzenes.). Report B1557, Swedish Environmental Research Int. (IVL), Stockholm, Sweden.

Kim KS, Hong KH, Ko YH, Kim MG. (2004). Emission characteristics of PCDD/Fs, PCBs, chlorobenzenes, chlorophenols, and PAHs from polyvinylchloride combustion at various temperatures. *J Air Waste Manag Assoc.* 54(5):555-562

King, TL, Lee, K, Yeats, P, Alexander, R. (2003). Chlorobenzenes in Snow Crab (*Chionoectes opilio*): Time-series monitoring following an accidental release. *Bull. Environm. Contam. Toxicol.* 71: 543-550.

Klimisch HJ, Andreae M, Tillman U. 1997. A systematic approach for evaluating the quality of experimental toxicological and ecotoxicological data. *Regul Toxicol Pharmacol* 25: 1-5.

Landrum PF, Steevens JA, Gossiaux DC, McElroy M, Robinson S, Begnoche L, Chernyak S, Hickey J. 2004. Time-dependent lethal body residues for the toxicity of pentachlorobenzene to *Hyalella azteca*. *Environ Toxicol Chem* 23: 1335-1343.

Legierse KCHM, Sijm DTHM, Van Leeuwen CJ, Seinen W, Hermens JLM. 1998. Bioconcentration kinetics of chlorobenzenes and the organophosphorus pesticide chlorthion in the pond snail *Lymnaea stagnalis* - a comparison with the guppy *Poecilia reticulata*. *Aquat Toxicol* 41: 301-323.

Linder, R., T. Scotti, J. Goldstein, K. McElroy, and D. Walsh. 1980. Acute and subchronic toxicity of pentachlorobenzene. *J. Environ. Pathol. Toxicol.*, 4(5-6): 183-196.

Lunde, G., Bjorseth, A. (1977). Human blood samples as indicators of occupational exposure to persistent chlorinated hydrocarbons. *Sci. Total Environm.* 8(3): 241-246.

Lydy MJ, Belden JB, Ternes, MA. (1999). Effects of temperature on the toxicity of M-Parathion, Chlorpyrifos, and Pentachlorobenzene on *Chironomus tentans*. *Arch. Environ. Contam. Toxicol.* 37: 542-547.

Mackay D, Shiu W-Y, Ma K-C, Lee SC. 2006. Physical-chemical properties and environmental fate for organic chemicals. 2nd ed. Boca Raton, FL, U.S.A.: CRC Press, Taylor & Francis Group. 4182 pp.

Mantseva E, S Dutchak, O Rozovskaya, V Shatalov. 2004. EMEP contribution to the preparatory work for the review of the CLRTAP Protocol on Persistent Organic Pollutants. EMEP MSC-E Information Note 5/2004. Meteorological Synthesizing Centre –East, Moscow, Russia.

Masunaga S, Susarla S, Yonezawa Y. Dechlorination of chlorobenzenes in anaerobic estuarine sediment. *Water Science and Technology* 1996;33:173-180.

Ministry of the Environment of Ontario (1999). Niagara river mussel biomonitoring program 1997.

Ministry of the Environment of Ontario (2003). Niagara river mussel biomonitoring program 2000.

Mortimer MR, Connell DW. 1993. Bioconcentration factors and kinetics of chlorobenzenes in a juvenile crab [*Portunus pelagicus* (L)]. *Aust J Mar Freshwater Res* 44: 565-576.

Mortimer MR, Connell DW. 1995. Effect of exposure to chlorobenzenes on growth rates of the crab *Portunus pelagicus* (L). *Environ Sci Technol* 29:1881-1886.

Muller J, Dongmann G, Frischkorn CGB. (1997). The effect of aluminium on the formation of PAH, methyl-PAH and chlorinated aromatic compounds during thermal decomposition of PVC. *Journal Anal and Appl Pyrolysis* 43:157 – 168.

NITE (2007). (Japan, National Institute of Technology and Evaluation) at <http://www.safe.nite.go.jp/english/db.html>. accessed March 17 2007.

NTP (National Toxicology Program) (1991). NTP report on the toxicity studies of Pentachlorobenzene in F344 rats and B6C3F1 mice (feed studies). NTP Tox 6. US Department of Health and Human Services, RTP, North Carolina. available through (<http://ntp.niehs.nih.gov/index.cfm?objectid=072C8956-036B-A0CA-51A7A8D30E5E7BDA>)

Oliver BG, Niimi AJ. 1983. Bioconcentration of chlorobenzenes from water by rainbow trout: correlations with partition coefficients and environmental residues. *Environ. Sci. Technol.*; 17, 287-291.:

OSPAR Commission for the protection of the marine environment of the North-East Atlantic (1998) OSPAR Strategy with regard to Hazardous Substances
http://www.ospar.org/eng/html/sap/strategy_hazardous_substances.htm

PHYSROP Database; Environmental Fate Data Base (EFDB) at Syracuse Research Centre. Available at:
<http://www.syrres.com/esc/efdb.htm>

Priority Substance No. 26. Pentachlorobenzene. Substance Data Sheet. (2005). Environmental Quality Standards (EQS). Brussels: EU Common Implementation Strategy for the Water Framework Directive.

Ramanand K, Balba MT, Duffy J. Reductive dehalogenation of chlorinated benzenes and toluenes under methanogenic conditions. *Applied and Environmental Microbiology* 1993;59:3266-3272.

Renberg L, M. Tarkpea, E. Linden. 1985. The use of the bivalve *Mytilus edulis* as a test organism for bioconcentration studies. *Ecotoxicol. Environ. Saf.* 9, 171-178.

Ribes A, Grimalt JO, Torres Garcia CJ, Cuevas E. (2002). Temperature and organic matter dependence of the distribution of organochlorine compounds in mountain soils from the subtropical Atlantic (Teide, Tenerife Island). *Environ Sci Technol.* 236(9):1879-85.

Rosberg et al., (2006). Ullmann's Encyclopedia of Industrial Chemistry.

Scheunert I, Topp E, Schmitzer J, Klein W, Korte F. Formation and fate of bound residues of [¹⁴C]benzene and [¹⁴C]chlorobenzenes in soil and plants *Ecotoxicology and Environmental Safety* 1985;9:159-170.

Schuler LJ, Landrum PF, Lydy MJ. (2006). Comparative toxicity of fluoranthene and pentachlorobenzene to three freshwater invertebrates. *Environ Toxicol Chem* 25: 985-994

Schuler LJ, Landrum PF, Lydy MJ. 2007. Response spectrum of fluoranthene and pentachlorobenzene for the fathead minnow (*Pimephales promelas*). *Environ Toxicol Chem* 26: 139-148.

Schuler, LJ, Landrum, PF, Lydy MJ. (2007b). Response spectrum of pentachlorobenzene and fluoranthene for *Chironomus tentans* and *Hyalella azteca*. *Env. Toxicol. Chem.* 26(6): 1248-1257.

Shen, L, F Wania, YD Lei, C Teixeira, DCG Muir, TF Bidleman. 2005. Atmospheric distribution and long-range transport behaviour of organochlorine pesticides in North America. *Environ. Sci. Technol.* 39: 409-420.

Shen H, Main KM, Virtanen HE, Damgaard IN, Haavisto AM, Kaleva M, Boisen KA, Schmidt IM, Chellakooty M, Skakkebaek NE, Toppari J, Schramm KW. (2007). From mother to child: Investigation of prenatal and postnatal exposure to persistent bioaccumulating toxicants using breast milk and placenta biomonitoring, *Chemosphere*

Slobodník, J., Dogterom J. (2003). UNDP/GEF Danube Regional Project Strengthening the Implementation Capacities for Nutrient Reduction and Transboundary Cooperation in the Danube River Basin. Analysis of the results of the EMIS inventory and their comparison with TNMN and JDS results with particular attention to the EU Priority List of Pollutants Project Component 2.2: Development of operational tools for monitoring, laboratory and information management with particular attention to nutrients and toxic substances. Rodeco Consulting GmbH.
http://www.undp-drp.org/pdf/2.2_Tools_20for_20WQMLIM_20_20phase_20I/Chapter_20III_20EMIS_20Inventory_20FINAL.pdf

Slooff W., Bremer H.J., Hesse J.M. and Matthijsen A.J.C.M. (eds.) 1991. Integrated criteria document chlorobenzenes. Report no. 710401015. RIVM.

Smeds, A., Saukko, P. (2001). Identification and quantification of polychlorinated biphenyls and some endocrine disrupting pesticides in human adipose tissue from Finland. *Chemosphere* 44(6): 1463-1471.

- Sternbeck, J., Brorström-Lundén, E., Remberger, M., Kaj, L., Palm, A., Junedahl, E., Cato, I., 2003. WFD priority substances in sediments from Stockholm and the Svealand coastal region. Report B1538, Swedish Environmental Research Inst. (IVL), Stockholm, Sweden. <http://www.ivl.se/rapporter/pdf/B1538.pdf>
- Susarla S, Yonezawa Y, Masunaga S. Transformation kinetics and pathways of chlorophenols and hexachlorobenzene in fresh water lake sediment under anaerobic conditions *Environmental Technology* 1997;18:903-911.
- Thomas RS, Gustafson DL, Pott WA, Long ME, Benjamin SA, RS Yang. 1998. Evidence for hepatocarcinogenic activity of pentachlorobenzene with intralobular variation in foci incidence. *Carcinogenesis* 19: 1855-1862
- Umegaki, K, Ikegami, S., Ichikawa, T. (1993). Effects of restricted feeding on the absorption, metabolism, and accumulation of pentachlorobenzene in rats. *J. Nutr. Sci. Vitaminol.* 39:11-22.
- US EPA (1998). Memorandum 2/26/98 Assessment of the Dietary Cancer Risk of Hexachlorobenzene and Pentachlorobenzene as impurities in Chlorothalonil, PCNB, Picloram, and several other pesticides. DP Barcode D243499. Chemical codes 061001 (Hexachlorobenzene) & 081901 (Chlorothalonil). http://www.epa.gov/oppsrrd1/reregistration/endosulfan/hexachlorobenzene_endo.PDF
- United States Environmental Protection Agency Superfund. (n.d.) APPENDIX K. Soil Organic Carbon (Koc) /Water (Kow) Partition Coefficients. http://www.epa.gov/superfund/resources/soil/appd_k.pdf
- United States Environmental Protection Agency Toxics Release Inventory (TRI) Program (2007a) <http://www.epa.gov/tri/tridata/index.htm#pdr>. Accessed 280307.
- U.S. EPA. (2007b). EPI Suite™ [computer program]. version 3.2. Washington, DC, U.S.A.: U.S. Environmental Protection Agency (EPA) Office of Pollution Prevention Toxics and Syracuse Research Company (SRC). http://www.syrres.com/esc/est_soft.htm.
- US National Institute of Standards and Technology. NIST Chemistry WebBook. NIST Standard Reference Database Number 69, June 2005 Release. Available at: <http://webbook.nist.gov/chemistry/>
- Van Gestel, C.A., W.-C. Ma and C.E. Smit. 1991. Development of QSARs in terrestrial ecotoxicology: earthworm toxicity and soil sorption of chlorophenols, chlorobenzenes and dichloroaniline. *Sci. Total Environ.* 109/110: 589–604.
- Van de Plassche EJ, Polder MD, Canton JH (1993). Derivation of maximum permissible concentrations for several volatile compounds for water and soil. Bilthoven, the Netherlands: National Institute of Public Health and Environmental Protection., Report no. 679101 008.
- Van de Plassche, E.J., Schwegler, A.M.G.R., Rasenberg, M. and Schouten, A. (2002) Pentachlorobenzene. Dossier prepared for the third meeting of the UN-ECE Ad hoc Expert Group on POPs. Royal Haskoning report L0002.A0/R0010/EVDP/TL
- Van Leeuwen, S., Traag, W., de Boer, J., 2004. Monitoring of brominated flame retardants, dioxines, PCBS and other organohalogen compounds in fish from the Netherlands. *Organohalogen compounds* 66: 1764-1769.
- Vorkamp, K., Riget, F., Glasius, M., Pecseli, M., Lebeuf, M., Muir, D. 2004. Chlorobenzenes, chlorinated pesticides, coplanar chlorobiphenyls and other organochlorine compounds in Greenland biota. *Sci Total Environ.* 331: 157-175.
- Vulykh N, S. Dutchak, E. Mantseva, V. Shatalov. 2005. Model assessment of potential for long-range transboundary atmospheric transport and persistence of Pentachloro-benzene. EMEP contribution to the preparatory work for the review of the CLRTAP Protocol on Persistent Organic Pollutants. EMEP MSC-E 15/2005. Meteorological Synthesizing Centre –East, Moscow, Russia.
- Wang M-J, Jones KC. Behavior and fate of chlorobenzenes in spiked and sewage sludge-amended soil *Environmental Science and Technology* 1994;28:1843-1852.
- Wang M-J, McGrath SP, Jones KC. Chlorobenzenes in field soil with a history of multiple sewage sludge applications *Environmental Science and Technology* 1995;29:356-362.

Wegmann, F, MacLeod, M, Scheringer, M. (2007). Pop Candidates 2007: Model results on overall persistence and Long-range transport potential using the OECD Pov & LRTP screening tool.

http://www.pops.int/documents/meetings/poprc/prepdocs/annexEsubmissions/All_20chemicals_20Switzerland.pdf

WHO-IPCS International Programme on Chemical Safety. (1991). Environmental Health Criteria (EHC) 128: Chlorobenzenes other than Hexachlorobenzene. United Nations Environment Programme. International Labour Organisation. World Health Organization. Geneva. Available at:

<http://www.inchem.org/documents/ehc/ehc/ehc128.htm>

WHO-IPCS (World Health Organization – International Programme on Chemical Safety), 1997. Hexachlorobenzene, Environmental Health Criteria 195. World Health Organization, Geneva, Switzerland.

<http://www.inchem.org/documents/ehc/ehc/ehc195.htm>.

Yakata N, Sudo Y, Tadokoro H. 2006. Influence of dispersants on bioconcentration factors of seven organic compounds with different lipophilicities and structures. Chemosphere 64: 1885-1891.

Ying CO, Conolly RB, Thomas RS, Xu Y, Andersen ME, Chubb LS, Pitot HC, Yang RSH. 2001. A clonal growth model: time-course simulations of liver foci growth following penta- or hexachlorobenzene treatment in a medium-term bioassay. Cancer Research, 61: 1879-1889.

Qiao, P, Farrell, AP. (1996). Uptake of hydrophobic xenobiotics by fish in water laden with sediments from the Fraser river Environ Toxicol Chem 15: 1555-1563.
