

Alpha Hexachlorocyclohexane (Alpha HCH)

Draft Risk Profile May 2007

http://www.pops.int/documents/meetings/poprc/drprofile/drprofile/DraftRiskProfile_a-HCH.pdf

Composition	One of 5 stable HCH isomers in technical HCH
Uses	Alpha-HCH by itself is neither intentionally produced nor placed on the market but produced as the main constituent of technical HCH which is used as organochlorine insecticide or chemical intermediate to manufacture enriched gamma-HCH (Lindane).
Releases	Historically, alpha-HCH was released during the manufacture of technical HCH and its use as a pesticide. Li and Macdonald (2005) estimated the global usage of alpha-HCH (based on data on technical HCH) at 6 millions tons, with 4.3 millions tons emitted into the atmosphere. Releases of alpha-HCH into the environment are also possible from hazardous waste sites, stockpiles and residues of Lindane production, which are not always controlled or maintained safely. Also, contaminated sites (e.g. from former production plants) may contribute to the environmental burden of alpha-HCH. Though no quantitative estimates of these releases exist, the amounts of HCH residuals in the form of by-products from Lindane production are assumed to range between 1.6 - 1.9 to 4.8 million tons.
Fate	Degradation is very slow especially at lower temperatures. Half-lives for alpha-HCH in Arctic lakes were up to 1.4 years, whereas in the Eastern Arctic Ocean enantioselective degradation resulted in a range of approximately 5 to 17 years. High levels are found in Arctic biota because of the bioaccumulation potential of alpha-HCH (as a product of bioconcentration and biomagnification) and the historically particularly efficient deposition processes of this substance in the Arctic waters. The efficient accumulation is an effect of the combination of the physico-chemical properties of alpha-HCH and the low temperature in the Arctic. In other words, alpha-HCH effectively accumulates in the Arctic ecosystem as a whole.
Effects	Alpha-HCH has been shown to be neurotoxic, hepatotoxic, and to cause immunosuppressive effects and cancer in laboratory animals. The International Agency for Research on Cancer (IARC) has classified alpha-HCH in group 2B, possibly carcinogenic to humans. Several epidemiological studies indicate that alpha-HCH might play a role in human breast cancer. Alpha-HCH is a known tumour promoting agent. Alpha-HCH may adversely affect human health in contaminated areas as well as in Arctic regions. Based on the available toxicity data of alpha-HCH, it can be concluded that current concentrations of alpha-

	<p>HCH in food and human breast milk are a matter of concern. The estimated daily intake of alpha-HCH of Arctic indigenous people exceeds safe intake reference values, even though estimation is very conservative. Compared with a general accepted risk of one case per million, this risk seems unacceptably high. Nevertheless it should be emphasized that traditional foods have unique social, cultural, spiritual and economic value and therefore it is strongly recommended to avoid alpha-HCH levels of concern. Human exposure to alpha-HCH results mostly from ingestion of contaminated plants, animals and animal products. Monitoring data from a wide range of biota including humans suggest that significant uptake from the environment occurs, which demonstrates the bioavailability of alpha-HCH. Monitoring data show its ubiquitous distribution in all environmental media</p>
Exposure	<p>Human exposure to alpha-HCH results mostly from ingestion of contaminated plants, animals and animal products. Monitoring data from a wide range of biota including humans suggest that significant uptake from the environment occurs, which demonstrates the bioavailability of alpha-HCH. Monitoring data show its ubiquitous distribution in all environmental media</p>
Status	<p>Technical HCH is listed in Annex II of the 1998 Aarhus Protocol on Persistent Organic Pollutants (POPs) under the Convention on Long-Range Transboundary Air Pollution which restricted alpha-HCH use to an intermediate in chemical manufacturing only. HCH (mixed isomers) is subject to the PIC Procedure of the Rotterdam Convention and is listed in Annex III of the Convention. In the European Union, the production and use of technical HCH as an intermediate in chemical manufacturing will be phased out by the end of 2007 at the latest (Regulation (EC) No 850/2004). HCHs are also among the priority substances (Decision No 2455/2001/EC) of the adopted EU Water Framework Directive 2000/60/EC. Hexachlorocyclohexane isomers, including the alpha-isomer, are on the List of Chemicals for Priority Action under the OSPAR Commission for the Protection of the Marine Environment of the Northeast Atlantic.</p>
Alternatives	<p>Will be discussed together with Lindane in Annex F evaluation if Alpha HCH advances.</p>