

## **Decision POPRC-2/10: Beta hexachlorocyclohexane**

*The Persistent Organic Pollutants Review Committee,*

*Having examined* the proposal by Mexico, which is a Party to the Stockholm Convention on Persistent Organic Pollutants, to list beta hexachlorocyclohexane (Chemical Abstracts Service number 319-85-7) in Annexes A, B and/or C to the Convention and having applied the screening criteria specified in Annex D to the Convention,

1. *Decides*, in accordance with paragraph 4 (a) of Article 8 of the Convention, that it is satisfied that the screening criteria have been fulfilled for beta hexachlorocyclohexane, as set out in the evaluation contained in the annex to the present decision;

2. *Decides furthermore*, in accordance with paragraph 6 of Article 8 of the Convention and paragraph 29 of decision SC-1/7 of the Conference of the Parties to the Stockholm Convention, to establish an ad hoc working group to review the proposal further and to prepare a draft risk profile in accordance with Annex E to the Convention;

3. *Invites*, in accordance with paragraph 4 (a) of Article 8 of the Convention, Parties and observers to submit to the Secretariat the information specified in Annex E before 2 February 2007.

### **Annex to decision POPRC-2/10**

#### **Evaluation of beta hexachlorocyclohexane against the criteria of Annex D**

##### **A. Background**

1. The primary source of information for the preparation of this evaluation was the proposal submitted by Mexico, contained in document UNEP/POPS/POPRC.2/INF/8.
2. Additional sources of scientific information included critical reviews prepared by recognized authorities and peer-reviewed scientific papers.

##### **B. Evaluation**

3. The proposal was evaluated in the light of the requirements of Annex D, regarding the identification of the chemical (paragraph 1 (a)) and the screening criteria (paragraphs 1 (b)–(e)):

###### **(a) Chemical identity:**

- (i) Adequate information was provided in the proposal and supporting documents;
- (ii) The chemical structure was provided. Information on specific physico-chemical properties of beta hexachlorocyclohexane (beta-HCH) was also provided;

The chemical identity of beta-HCH is clearly established;

###### **(b) Persistence:**

- (i) Beta-HCH is resistant to abiotic degradation processes like photolysis and hydrolysis (Ref. 1);
- (ii) Beta-HCH showed half-lives in soil laboratory and field studies of 91–184 days (Ref. 2). A compilation of degradation data, however, underlay the assertion of the proposal that beta-HCH is, due to its chemical structure, the most persistent HCH isomer (Ref. 3). It

comprised 80–100 per cent of the total HCH residues found in soil and vegetation on land surrounding an industrial landfill in Germany 10 years after the final HCH input (Ref. 2);

- (i) Monitoring data from the Arctic can serve as an indication for the persistence of beta-HCH. There is evidence that the dominant transportation route of beta-HCH into the Arctic ocean occurs via ocean currents (Ref. 4);

There is sufficient evidence that beta-HCH meets the criterion on persistence;

**(c) Bioaccumulation:**

- (i) The log Kow reported in the proposal is 3.7. The bioconcentration factor for fish was determined to be 1,460. Other reported bioconcentration factors for fish were in the range of 250–1,500 on a whole body dry weight basis (Ref. 5);

- (ii) and (iii) Field studies in Arctic marine food webs have demonstrated that beta-HCH can bioaccumulate in upper trophic levels (Ref. 1). Beta-HCH appears to be persistent in investigated species (Refs. 1, 6, and 7). Biomagnification factors for beta-HCH in marine food webs were mostly in the range of 1–18 (with a maximum value of 280). In birds and marine mammals in particular, beta-HCH can accumulate to higher levels than the other isomers (Refs. 1, 6 and 8). In the terrestrial Arctic food chain, beta-HCH can also biomagnify in mammals. Modelled biomagnification factors for wolves, depending on their age, ranged from 9 to 109 (Ref. 9);

Beta-HCH has been detected in adipose tissue (Ref. 10) and in breast milk in humans (Refs. 11, 12 and 13). It has been detected in placenta tissue exposing offspring at critical periods of development (Ref. 14);

In addition, available information confirms that the potential for bioaccumulation of beta-HCH is higher than that for lindane (Ref. 1).

There is sufficient evidence that beta-HCH meets the criterion on bioaccumulation;

**(d) Potential for long-range environmental transport:**

- (i) and (iii) Beta-HCH has a low vapour pressure ( $4.8 \times 10^{-5}$  Pa) and a low Henry's Law constant (Ref. 15). Modelling data show an estimated half-life in air of greater than 2 days. The estimated atmospheric half-life for beta-HCH was reported to be 15 days (Ref. 16). In contrast to alpha-HCH, the beta isomer was transported to the Arctic via ocean currents after atmospheric deposition in the North Pacific had occurred (Ref. 4);

- (ii) Monitoring data show that the substance is abundant in remote areas. Beta-HCH has been found in the Arctic Ocean (approximately 240 pg/l) and Arctic air, but at very low concentrations (Ref. 17). Compared to the other HCH isomers, data on beta-HCH in the marine abiotic environment are more limited (Ref. 18). Beta-HCH has also been detected in a variety of marine and terrestrial species. Residues in many investigated species remained unchanged or are on the increase (Ref. 15);

There is sufficient evidence that beta-HCH meets the criterion on potential for long-range environmental transport;

**Adverse effects:**

- (i) Beta-HCH is associated with renal and liver effects in laboratory animals. Beta-HCH is also a possible human carcinogen. The limited genotoxicity data indicate that beta-HCH has some genotoxic potential but the evidence is not conclusive (Ref. 1). Neurotoxic and immunotoxic effects of beta-HCH have been reported as well as reproductive and endocrine disrupting effects. Beta-HCH may be the most toxicologically significant HCH isomer due to the recent reports of its estrogenic effects in mammalian cells, laboratory mammals and fish (Ref. 19). Compared to lindane, toxicological data for beta-HCH are limited;
- (ii) Monitoring data indicate potential risks from dietary exposure of beta-HCH to communities in Alaska and others in the circumpolar Arctic region who depend on subsistence foods, such as caribou, seal and whale (Refs. 5 and 18). Regarding biological effects on wildlife, a significant negative correlation between retinol levels and HCHs isomer in Svalbard polar bears was found (Ref. 18);

There is sufficient evidence that beta-HCH meets the criterion on adverse effects.

**C. Conclusion**

- 4. The Committee concluded that beta-HCH meets the screening criteria specified in Annex D.

*References*

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