

# Lindane and Other HCH Isomers--EPA Risk Assessment Fact Sheet

February 8, 2006

## EPA Seeks Public Comment

EPA is seeking comments on its risk assessment for lindane and the other hexachlorocyclohexane (HCH) isomers, as well as ideas and suggestions on possible risk-reduction options. HCH isomers are byproducts of the lindane manufacturing process. The Agency's [February 8, 2006, Federal Register Notice](#) announced a 60-day comment period, closing on April 10, 2006. The risk assessment is available from [Regulations.gov](#) in Docket number EPA-HQ-OPP-2006-0034.

## EPA's Lindane and Other HCH Isomers Risk Assessment

Lindane and the other HCH isomers are mobile in the environment, and through long-range atmospheric transport, are deposited in the Arctic, where they have been detected in air, surface water, groundwater, sediment, soil, ice, snowpack, fish, wildlife, and humans. EPA's assessment indicates potential risks from dietary exposure to the alpha and beta HCH isomers to certain U.S. subpopulations, particularly communities in Alaska who depend on subsistence foods such as caribou, seal, and whale. Given the culture, way of life, and the dietary patterns of these communities, EPA is sensitive to the fact that traditional foods remain an outstanding source of a broad range of nutrients necessary for good health in these communities. The Agency seeks ideas and suggestions on ways to prevent contaminants from continuing to make their way into indigenous diets.

## Lindane Use in North America and Other Parts of the World

In North America, lindane currently is used in agriculture, veterinary science, and public health. In agriculture, lindane is used on ornamental plants and as a soil and seed treatment to protect seeds and seedlings. Although it is no longer registered for veterinary uses in Canada or the United States, lindane is used in Mexico to protect livestock from ticks, fleas, and other insects. Canada has discontinued all use of lindane except pharmaceutical use, and Mexico has decided to phase out all current uses of lindane. In other parts of the world, lindane is banned for use in 52 countries, restricted or severely restricted in 33 countries, not registered in 10 countries, and registered in 17 countries.

In the United States, lindane is used as a seed treatment on six agricultural crops: barley, corn, oats, rye, sorghum, and wheat. Depending on existing pest pressures, anywhere from 65 to 105 tons of

lindane active ingredient may be used annually for seed treatment. Percent of seeds treated is low (7% for wheat and barley; 1% for oats and rye; 6% for corn; and 1% for sorghum).

Seed treatment alternatives to lindane are available for barley, corn, sorghum, and wheat. These alternatives are as effective as lindane but are costlier to use. Currently there are no registered alternatives available for oats and rye; however, application for an alternative seed treatment (imidacloprid) is pending.

In the U.S. public health sector, lindane is regulated as a pharmaceutical drug. Less than one ton of lindane active ingredient is used annually in shampoos and creams to treat lice and scabies (mites).

### **2002 Lindane Reregistration Eligibility Decision**

The latest risk assessment represents EPA's follow-up to public comments received on the Agency's 2002 Lindane Reregistration Eligibility Decision (RED). In completing the Lindane RED, EPA decided that the six remaining lindane seed treatment uses (barley, corn, oats, rye, sorghum, and wheat) are eligible for reregistration, provided that certain conditions are met. Among other conditions, the Agency must be able to establish all required tolerances (maximum residue levels) for lindane residues on food. In response to the RED, EPA received public comments stating that other HCH isomers also should be considered in the Agency's decision-making. These isomers are included in the draft Lindane North American Regional Action Plan (NARAP). Consistent with the RED comments and with our national and regional actions summarized in the draft Lindane NARAP, the Agency has prepared the current assessment considering risks from exposures to the other HCH isomers.

### **The Role of the North American Commission for Environmental Cooperation**

The release of this assessment also is consistent with the North American Commission for Environmental Cooperation's (CEC's) Sound Management of Chemicals project, which is intended to reduce the risks of toxic substances to human health and the environment in North America through NARAP. The Commission's Lindane Task Force has nearly completed a draft Lindane NARAP based on input from government, industry, environmental NGOs, native peoples, and the general public. This draft is in final national intergovernmental review and will be sent for CEC ministerial concurrence and signature in June 2006.

### **Environmental Concerns about Lindane and other HCH Isomers**

Lindane and the other HCH isomers are members of the organochlorine family of chemicals. Lindane, the gamma isomer, has been widely used as an insecticide for decades. It is the only isomer in the group with pesticidal properties. Technical grade HCH also contains other isomers, including the environmentally significant alpha- and beta-HCH isomers. These HCH isomers are persistent, bioaccumulative, toxic, and mobile in the environment. Due to their persistence and ability to migrate long distances through air and water, the HCH isomers travel from sites where HCH is manufactured

and lindane is used. Although technical or manufacturing grade lindane has not been produced in the U.S. since the 1970s, it continues to be manufactured in Romania and India.

Through a process known as *long-range atmospheric transport*, lindane and the other HCH isomers are deposited in the Arctic where they have been detected in air, surface water, groundwater, sediment, soil, ice, snowpack, fish, wildlife, and humans. Historically, HCH isomers are among the most abundant organochlorine contaminants in the Arctic Ocean . The highest known concentrations are in the Beaufort Sea and the Canadian Archipelago; marine mammals in those regions have elevated residues of HCH isomers.

### **Effect on Arctic Subsistence Diets**

EPA's risk assessment indicates potential risks from dietary exposure to the alpha and beta HCH isomers to communities in Alaska and others in the circumpolar Arctic region who depend on subsistence foods, such as caribou, seal and whale. EPA is sensitive to indigenous cultures, ways of life, and dietary patterns, and recognizes that traditional foods remain an outstanding source of a broad range of nutrients necessary for good health in these communities. The Agency, therefore, is requesting input on ways to prevent HCH contaminants from continuing to make their way into indigenous diets.

### **Possible Health Effects**

A variety of toxicological effects, such as reproductive and neurotoxic impairments, have been recorded for lindane and other isomers of HCH in test animals. The alpha and beta isomers are associated with liver and kidney effects in laboratory animal studies. Alpha HCH is classified as a probable human carcinogen. Beta HCH is classified as a possible human carcinogen.

### **Next Steps**

EPA will carefully consider all comments received on the risk assessment, and any ideas or suggestions regarding risk mitigation options, in determining an appropriate course of action regarding lindane.

### **Where to find more information on lindane and other HCH isomers**

You will need Adobe Acrobat Reader, available as a free download, to view some of the files on this page. See [EPA's PDF page](#) to learn more about PDF, and for a link to the free Acrobat Reader.

**EPA - [Lindane reregistration](#)**

**EPA - "Assessment of Lindane and Other HCH Isomers"**

[Regulations.gov](#) , Docket Number EPA-HQ-OPP-2006-0034-0002

FDA - [Lindane Shampoo and Lindane Lotion Information](#)

**CEC documents on the NARAP for lindane**

- [Commission on Environmental Cooperation: Pollutants and Health](#) [EXIT Disclaimer](#)
- [North American Action Plan on Lindane](#) [EXIT Disclaimer](#)
- [Lindane Fact Sheet](#) [EXIT Disclaimer](#)