



## HCH in EU: part 1 History and usage of HCH

Lindane (Gamma HCH) has been produced and used for decades as an insecticide and against parasites. The production generated a lot of waste. We now know that these are Persistent Organic Pollutants (POPs) and that they are very harmful to people and the environment. For that reason, the use of Lindane is since 2009 prohibited. The consortium of TAUW (lead consultant), CDM Smith Europe and SARGA has been commissioned to identify the HCH affected sites in all EU Member States and to provide consultancy services to sustainably manage six of those sites.

An important project that makes us proud. In a series of articles, we are happy to tell you more about Lindane/HCH, to understand the origin and impact of HCH contaminated sites. In this part one, we would like to share with you the history, some basic chemistry and usage of Lindane.

### The history of HCH

The molecular structure of HCH consists of a ring with six-carbon with one chlorine and one hydrogen attached to each carbon molecule. Technical-HCH, also known as hexachlorocyclohexane is a mixture of

the HCH-isomers (figure 2) that presents itself as a white solid with an unpleasant musty odour. HCH was first synthesized by Michael Faraday in 1852 (figure 1) by reacting benzene with chlorine in bright sunlight. The Dutch chemist Teunis van der Linden isolated pure Gamma ( $\gamma$ )-HCH in 1912.

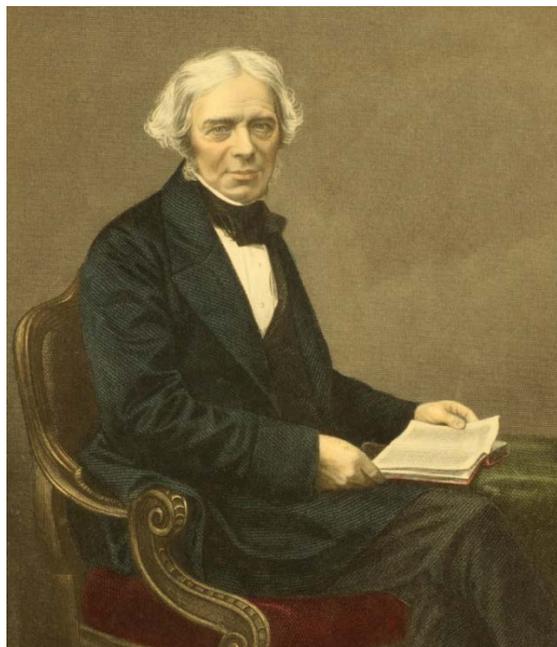


Figure 1 Michael Faraday

However, later researchers discovered Gamma-HCH potential to protect crops against pest and that the other HCH-isomers lack this characteristic. It was only in the 1940s that HCH was patented as pesticide. After 1942 large scale production started and soon the production switched to marketing only the active Gamma-isomer, branded 'Lindane'. To produce 1 ton Lindane, 8 to 10 tons of Technical HCH were needed. The inactive HCH-isomers were disposed around these factories and they were not aware of the environment impact of the dumped waste, by which we are confronted with up till today.

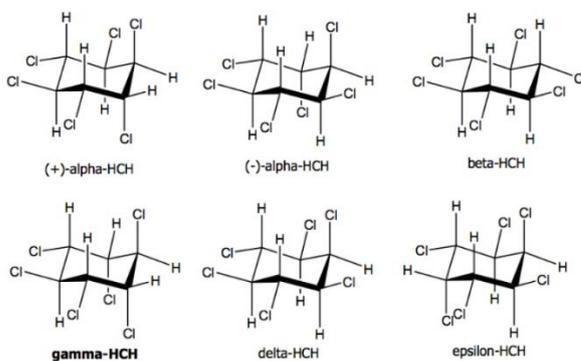


Figure 2 The isomers alpha, beta, gamma, delta, and epsilon HCH isomers (Buser and Muller, 1995).

### Odourless

In contrast to the Technical-HCH, Lindane has the added benefit that it is nearly odourless and does not influence crop quality, as such greatly improving the acceptance of consumers who, for example, disliked the fact that cooked potatoes smell of HCH after application of Technical-HCH .

### The usage

Lindane is offered in different formulations such as wettable powders, emulsifiable concentrates, suspensions, solutions, dust, and powders. It was used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, and for wood preservation and against ectoparasites in both

veterinary and human applications between 1945 and 2006. Also, various Lindane fumigation (figure 3) preparations for inside use have been sold such as fumigation strips and smoke generators which contained practically pure lindane to which a small quantity of binding material was added<sup>1 2</sup>. In those days, it was widely used in the agricultural sector and as a household item indoors that thoroughly cleaned your room, sofa, and mattress from parasites as well.

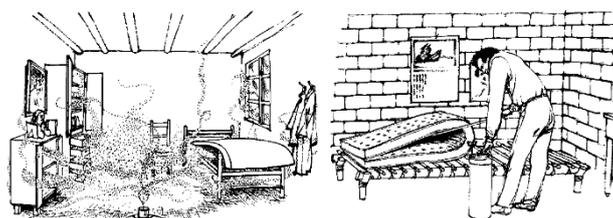


Figure 3 Indoor usage of smoke and fumigation (WHO, 1997)

### Prohibited

Nowadays the production is prohibited. By November 2006, the use of Lindane has been banned in 52 countries and restricted in 33 others. An international ban on the use of Lindane in agriculture was implemented in 2009 under the Stockholm Convention. Even tough, in some countries it is still produced and used (in low concentrations) for medical purposes such as treating lice and scabies.

### HCH in EU project

Within the HCH in EU project our objectives are to get a detailed view in all EU Member States of the production sites, waste deposits, landfills, and treatment centres of Lindane and HCH, and to help authorities dealing with the legacy of these POPs. For more information about this project please click [here](#).

### We will keep you informed!

In the next article in this series on HCH, we will bring up conceptual site models and impact on health and environment. Check the project page on our website you will be informed about the milestones of the HCH in EU project.

<sup>1</sup> WHO, 1991, IPCS International Programme on Chemical Safety. Health and Safety Guide No. 54 Lindane (gamma-HCH) health and safety guide. United Nations Environment Programme, <http://www.inchem.org/documents/hsg/hsg/hsg054.htm>

<sup>2</sup> WHO, 1997, Vector Control - Methods for Use by Individuals and Communities, [https://www.who.int/docstore/water\\_sanitation\\_health/vectcontro/ch23.htm](https://www.who.int/docstore/water_sanitation_health/vectcontro/ch23.htm)