

Persistent Organic Pollutants (POPs)

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Persistent Organic Pollutants (POPs) are chemical substances that persist in the environment, bio-accumulate through the food web, and pose a risk of causing adverse effects to the environment. POPs remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of living organisms and are toxic to humans and wildlife. With the evidence of long-range transport of these substances to regions where they have never been used or produced and the consequent threats they pose to the environment of the whole globe, the international community has now, at several occasions called for urgent global actions to reduce and eliminate releases of these chemicals.

The 12 POPs under the Stockholm Convention

Aldrin – A pesticide applied to soils to kill termites, grasshoppers, corn rootworm, and other insect pests.

Chlordane – Used extensively to control termites and as a broad-spectrum insecticide on a range of agricultural crops.

DDT – Perhaps the best known of the POPs, DDT was widely used during World War II to protect soldiers and civilians from malaria, typhus, and other diseases spread by insects. It continues to be applied against mosquitoes in several countries to control malaria.

Dieldrin – Used principally to control termites and textile pests, dieldrin has also been used to control insect-borne diseases and insects living in agricultural soils.

Dioxins – These chemicals are produced unintentionally due to incomplete combustion, as well as during the manufacture of certain pesticides and other chemicals. In addition,

certain kinds of metal recycling and pulp and paper bleaching can release dioxins. Dioxins have also been found in automobile exhaust, tobacco smoke and wood and coal smoke.

Endrin – This insecticide is sprayed on the leaves of crops such as cotton and grains. It is also used to control mice, voles and other rodents.

Furans – These compounds are produced unintentionally from the same processes that release dioxins, and they are also found in commercial mixtures of PCBs.

Heptachlor – Primarily employed to kill soil insects and termites, heptachlor has also been used more widely to kill cotton insects, grasshoppers, other crop pests, and malaria-carrying mosquitoes.

Hexachlorobenzene (HCB) – HCB kills fungi that affect food crops. It is also released as a byproduct during the manufacture of certain chemicals and as a result of the processes that give rise to dioxins and furans.

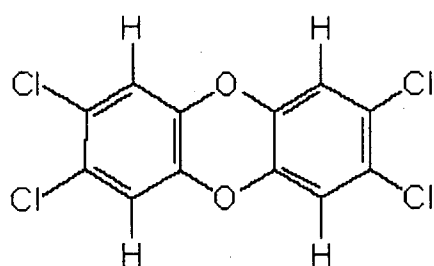
Mirex – This insecticide is applied mainly to combat fire ants and other types of ants and termites. It has also been used as a fire retardant in plastics, rubber, and electrical goods.

Polychlorinated Biphenyls (PCBs) – These compounds are employed in industry as heat exchange fluids, in electric transformers and capacitors, and as additives in paint, carbonless copy paper, sealants and plastics.

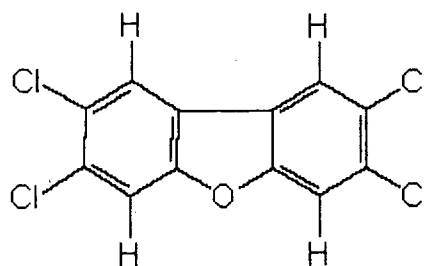
Toxaphene – This insecticide, also called camphechlor, is applied to cotton, cereal grains, fruits, nuts, and vegetables. It has also been used to control ticks and mites in livestock.

Of above 12 pops, 10 are pesticides used in Agriculture and Industry. The remaining 2, Dioxins and Furans are produced unintentionally due to various reasons mentioned above. Nevertheless, general public is in a position to control or minimize the release of Dioxins and Furans to our environment by taking appropriate steps. This lecture will be

mainly focused on the adverse effect of Dioxins and Furans and the ways and means of minimizing the release of them to our environment.



2,3,7,8-TCDD



2,3,7,8-TCDF

Polychlorinated dibenzo-*para*-dioxins (dioxins) and polychlorinated dibenzofurans (furans) are two groups of planar tricyclic compounds that have very similar chemical structures and properties. They may contain between 1 and 8 chlorine atoms; dioxins have 75 possible positional isomers and furans have 135 positional isomers. They are generally very insoluble in water, are lipophilic and are very persistent. Their properties vary with the number of chlorine atoms present.

For further details, please refer the websites below and others under the topic "POPS".

References:

<http://www.pops.int/> (Stockholm Convention on Persistent Organic Pollutants)

<http://www.chem.unep.ch/pops/> (United Nations, Environmental Programme)