



# INFOTOX (Pty) Ltd

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Retrieval and scientific interpretation of ecotoxicological information

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## Technical Note 004 Rev 1.0

### Dioxin Health Risk Assessment

The term *dioxin* or *dioxins* refers to a range of polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), and a range of coplanar polychlorinated biphenyls (PCBs) that have dioxin-like toxicity. Dioxins may cause cancer, disrupt the endocrine system and may cause reproductive and developmental effects. Toxicology studies showed that these compounds are extremely potent in producing a variety of effects at levels several orders of magnitude lower than most chemicals of environmental concern.

South Africa is a Party to the Stockholm Convention on Persistent Organic Pollutants (POPs), according to which dioxins are classified as POPs. In terms of this Convention, Parties must take measures to reduce and, if possible, eliminate emissions and unintentional production of dioxins.

The key sources of dioxin releases to air are from anthropogenic combustion processes and the production and use of chemicals contaminated with dioxins. Once released into the environment, dioxins may be transported over long distances as vapours or associated with particulates in the atmosphere. Eventually, dioxins partition to soils, surface waters, or plant vegetation as a result of dry or wet deposition. Volatilisation to the atmosphere removes dioxins from the water column to a minor extent. The most significant processes in the aquatic environment are bioconcentration by aquatic biota, or binding to particulates and sediment. Dioxins deposited on soils will strongly adsorb to organic matter. Due to low water solubility and high lipophilicity, dioxins bioaccumulate in aquatic organisms and also in plants, although foliar deposition and adherence are considered to be more significant in plants. This inevitably leads to uptake and biomagnification of dioxins in the food chain, which is the major source of human exposure.

INFOTOX estimates the daily dioxin intake of adults and children exposed to environmental sources of dioxin, and of breast-fed infants through ingestion of contaminated mother's milk. An integrated approach is followed, using media (air, soil and water) and biota dioxin concentrations (particularly in the food chain). INFOTOX is able to assist in sampling and analyses of dioxins in air, animal feeds, fish, meat and milk, but food chain concentrations may also be estimated using internationally accepted methodology. Potential human health risks are assessed in terms of body burdens and the relationship between daily intakes of dioxins and sensitive noncancer health endpoints. This method is also protective in the assessment of cancer risks.



Artist: Danie Smith