

Trichlorobenzenes

Trichlorobenzenes (TCBs) are aromatic chlorinated compounds comprising the three isomers 1,2,3 TCB, 1,2,4 TCB and 1,3,5 TCB. Commercial TCB consists mainly of 1,2,4 TCB and is used as intermediate in the production of herbicides, pigments and dyes.

What is the problem?

TCBs do not readily biodegrade and have a high potential to bioaccumulate and adhere to the organic matter of sediments. They are very toxic to aquatic organisms and may cause long term adverse effects in the marine environment, including reproductive and endocrine disrupting effects. The main source for TCB releases to water and air are production and use as intermediate in manufacturing processes. Other sources include releases as by-product from the production of hexachlorbenzol (HCB), lindane and other hexachlorcyclohexan (HCH) isomers, waste streams, including from imported products containing TCBs, and combustion of plastics and degradation of higher chlorinated benzenes.

What has been done?

Production and use of TCBs have declined in the OSPAR area since 1998; only one production site remains and the German producer no longer sells TCB for dispersive uses. EU measures regulate the releases from main industrial sources. The main uses of TCB as intermediate have been restricted in the EU framework with effect from summer 2007. Existing and planned international and EU control measures on HCB and HCH isomers contribute to reduction of releases of TCBs. Losses of TCB from diffuse sources, especially from products via waste streams, have not been regulated.

Did it work?

There is a clear indication of reduction in TCB releases from point sources over the period 1985 – 1998. This is consistent with a reduction in production volumes from 17 000 to 4 000 tonnes per year over the period 1983 – 2003. However, data on discharges, emissions and losses since 1998 are scarce. Discharges to water from remaining production of TCBs in the OSPAR area are estimated to be 30 kg per year. With regulation of main point sources, it is expected that wastes, including waste water treatment effluents, are the main source for releases to water but no data are available for quantification. Limited information on emission to air suggests reduction from industrial sources; data reported in 2004 suggest total emissions of 0.19 tonnes in the OSPAR area. With recent use restrictions there is indication that a downward trend in releases may be expected. Further efforts are needed to move towards the cessation target in 2020.

How does this affect the quality status?

Marine environmental data are limited, often below detection limits and mostly restricted to sites close to pollution sources. In the Greater North Sea, levels measured in coastal and inshore waters (including rivers) at reference and contaminated sites are below EU environmental quality standards for TCB (0.4 µg/l) except for concentrations in the Scheldt estuary (0.64 µg/l). Contamination in sediments and biota at the Norwegian North Sea coast at sites close to sources reach 0.05 ng/g. Concentrations in mussels in the southern North Sea were observed at levels up to 5 ng/g dw. In Arctic Waters, sediment concentrations at contaminated sites reach 1.20 ng/g d.w. The observed concentrations of TCB in water and sediment in the OSPAR area are below threshold levels proposed in literature for 'no-effect' for the marine aquatic environment and suggest that they give no cause for concern. The possibility of reproductive and endocrine disrupting effects has not been excluded. More monitoring information is necessary to conclude on the distribution and levels of TCBs in the OSPAR maritime area and their concern for the marine environment.

Electronic navigator to OSPAR publication sources (publication number):

- ↳ Status and trend of marine chemical pollution (395/2009) – Annex 2 for monitoring data
- ↳ Towards the cessation target (354/2008)
- ↳ Background Document for trichlorobenzenes (170/2005) (as updated)