

## Phthalates

Dibutylphthalate (DBP), diethylhexylphthalate (DEHP) and butylbenzyl (BBP) are part of the group of 'certain phthalates' which have been prioritised by OSPAR for action. They are mainly used in the polymer industry as plasticisers in PVC. Phthalates are not chemically bound to the plastics and can be released from them during their life cycle. A variety of industries use phthalates also as softeners, adhesives or solvents in consumer products, including sealants, paints, printing inks, cosmetics, coatings of different products such as cars, coils, cables or fabrics. The widely used phthalates (plasticisers) di(isononyl)phthalate (DINP) and di(isodecyl)phthalate (DIDP) were removed from the OSPAR list of chemicals for priority action in 2006 on the basis of new information.

### ***What is the problem?***

The three priority phthalates are suspected to cause endocrine disruption and have been classified in the EU as carcinogenic, mutagenic and reprotoxic (CMR) substances and thus are of concern for environmental and human health. None meet all three PBT criteria but phthalates can be persistent and do not degrade easily under anaerobic conditions in sediments and at low temperatures. DBP and BBP are considered highly toxic to aquatic organisms. Phthalates are used in large volumes of which DEHP was the major fraction in 1998. Diffuse losses of DBP and DEHP from their use as plasticisers in consumer products are the main source of concern. DEHP enters the environment mainly via direct releases to air and waste water, from sewage sludge and from solid waste. In air, DEHP may occur both in vapour phase and as solid particles. Particles formed by weathering of polymers probably represents an important route of DEHP distribution. Phthalates may also be released to the environment from production and manufacturing sites causing elevated local exposure.

### ***What has been done?***

EU measures regulate industrial sources of phthalates. EU use restrictions for DEHP, DBP and BBP target only selected consumer products, such as toys and childcare products and focus on health protection. Further use and marketing restrictions are still under consideration.

### ***Did it work?***

Since classification as CMR substances (carcinogens, mutagens and reproductive toxicants), the market for DEHP and DBP has declined and they now form only a smaller part of the phthalate consumption in Europe. However, due to the large quantities consumed annually (285 000 t estimated for 2007) and the use in many articles with long service life, diffuse releases of DEHP to the environment are expected to continue for some years through waste streams. Quantitative information on releases and transport to the sea is scarce. Recent estimates suggest that 11 600 t of DEHP were released to the environment in 2007, with two thirds to soil, 3400 t to waste water and 600 t to air. Measurements of effluent water from various sources, including sewage treatment plants, in the late 1990s suggest a total release of 800 tonnes per year, corresponding to 4.5% of the annual consumption in the EU at that time. Further efforts are necessary to control and reduce releases to the environment in order to achieve the cessation target by 2020.

### ***How does this affect the quality status?***

Since 2000, DEHP has been reported to be widespread in mussels, fish and sediments in Arctic Waters (Region I), Greater North Sea (Region II) and Celtic Seas (Region III) at both reference and polluted sites. The highest concentrations in mussels found at a reference site are 1.523 mg/kg w.w. in Norwegian waters. The highest concentrations in fish liver were found at remote Nordic sites, maximum at 55.7 mg/kg w.w. (DEHP). There are indications that DEHP is transported by air in particulate form towards the colder regions, where it is trapped during the winter and released again during the summer. This is consistent with the increasing concentrations observed in marine

sediments and fish liver from southern to northern Norway. DEHP could therefore be subject to 'global distillation', a process recognised for POPs with capability for long-range transport.

No concentrations of DEHP have been reported above the PNEC value in sediments. The PNECs for DEHP in food for mammals, birds and fish have been calculated to be 3.3, 17 and 16 mg/kg w.w. food respectively. Based on these values, only in remote areas of Region I DEHP concentrations have been found in fish liver which can pose a risk for mammals and to a lesser extent to birds through the food chain. There is no information available to compare observed concentrations in seawater with PNECs. There is a need to further investigate the environmental risks of phthalates in the northern parts of the OSPAR area.

*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 Documents for phthalates  
(270/2005) (as updated)