

Science for Environment Policy

Dangerously high levels of endocrine disrupting chemicals found in marine sediments

Endocrine disrupting chemicals (EDCs) can interfere with the hormonal systems of both humans and wildlife. New research quantifying EDCs in marine environments in Greece found concentrations which present significant risks to sediment-dwelling organisms.

Reduction and prevention of chemical pollution and subsequent harm to marine ecosystems is a key aim of the EU Marine Strategy Framework Directive¹. EDCs can enter the marine environment via sewage, industrial waste water or indirectly through watercourses. Once present in the ecosystem, EDCs often take a long time to decay and can cause feminisation, decreased fertility or reduced immune function in marine organisms.

The study site, the Thermaikos Gulf in Greece, is an extended coastal shelf with substantial input from three rivers. The area is commercially important as the Gulf hosts 85% of Greek mussel production. There are several potential sources of EDCs, including tannery wastewater, agricultural runoff and sewage, which are all discharged into the Gulf.

In this study, researchers measured levels of nine different EDCs of two broad types (steroid or phenolic). To determine where within the marine ecosystems EDCs were found, researchers tested samples of seawater, particles suspended in the water, sediments and mussels.

Phenolic EDCs were more common than steroids and were found in all samples. Concentrations of steroids were below detectable levels in both seawater and sediment. The EDCs with the highest concentrations across seawater, suspended particles and sediments were nonylphenol (NP) and NP ethoxylates, chemicals used in the production of detergents.

To assess the potential environmental impact, researchers calculated 'risk quotients': the ratio of observed concentration to no-effect concentration (i.e. the level at which the chemical is expected to have no harmful impact). Concentrations of NP in sediments were of particular concern; risk quotients ranged from 7 to 42 were found, representing significant risk to organisms living in the sediment.

Mussels, as well as being commercially important to the area, are filter-feeders that can act as pollution indicators. However, sampled mussels contained relatively low concentrations of EDCs; bio-concentration factors for NP (which take into account concentrations in the surrounding water) ranged from 284 to 825 litres per gram.

The researchers acknowledge that since January 2005 the sale and use of products containing over 0.1% NP or NP ethoxylates has been restricted in Europe. However, they warn that the levels of phenols found are concerning, particularly in sediment, and recommend that policymakers take action to reduce EDC pollution.

24 January 2012
Issue 314

**Subscribe to free
weekly News Alert**

Source: Arditsoglou, A. and Voutsas, D. Occurrence and partitioning of endocrine-disrupting compounds in the marine environment of Thermaikos Gulf, Northern Aegean Sea, Greece. *Marine Pollution Bulletin*. 64: 2243-2452. DOI: 10.1016/j.marpolbul.2012.07.048

Contact:
dvoutsas@chem.auth.gr

Theme(s): Chemicals,
Marine ecosystems

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission.

To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

1. See: http://ec.europa.eu/environment/water/marine/directive_en.htm