

Phthalate esters in seawater, sediments and marine biota from the Aegean Sea (Eastern Mediterranean)

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Phthalate esters (PAEs) are widely used in the manufacturing and processing of plastic products as plasticizers. They are endocrine disrupting chemicals and their environmental behavior has attracted considerable attention due to their potential impacts on the ecosystem and on public health. PAEs were studied in seawater, sediments and mussels (*Mytilus galloprovincialis*) collected from various marine sites in Greece, including the major estuaries, industrialized areas, sites directly influenced from big cities (Athens and Thessaloniki) and also deep open sea sites. Eight PAEs, belonging in the priority organic contaminants lists, were determined (DMP, DEP, DBP, DnBP, BBP, DEHP, DnOP, DNP) using GC-MS technique.

In seawater, the highest concentrations were measured in sites affected from urban and industrial activities, whereas DEHP was the most abundant compound in all cases, followed by DnBP. The distribution of each PAE between dissolved and particulate phases seems to depend on the log K_{ow} values. 80-86% of the lower molecular weight PAEs (DMP, DEP, DnBP, BBP), having also the lower log K_{ow} values, were found in the dissolved phase, while 52-83% of DEHP, DnBP and DNP were bound to the particulate phase.

In sediments, the most contaminated site with ΣPAEs concentrations above 100 mg/Kg was close to Athens sewage outfall, while in deep open sea stations PAEs values were similar to those found in estuarine systems, indicating that atmospheric deposition plays an important role in transferring PAEs into the marine environment. DEHP was again predominant in all sediment samples.

All PAEs were detected in mussel samples and the bioaccumulation factors (BAF) were calculated. Although the highest BAF values (~1000) were found for DEHP, DnBP and DNP, when these values were normalized to the lipid content of the mussels, it seems that DMP and DEP had the greatest bioaccumulation potential.