

Use of Passive Samplers to Measure Dissolved Organic Contaminants in a Temperate Estuary

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Measuring dissolved concentrations of organic contaminants can be challenging given their low solubilities and high particle association. However, to perform accurate risk assessments of these chemicals, knowing the dissolved concentration is critical since it is considered to be the best measure of biological exposure in aquatic systems. Recently, passive sampling methods have been used for measuring dissolved concentrations in water and sediments. To date, the emphasis of passive sampler development and use has been on monitoring legacy contaminants, but the technology is applicable to some emerging contaminants although data for this class of chemicals is currently very limited. In this study, several contaminants were measured in water column deployments using polyethylene (PE) and polyoxymethylene (POM) passive samplers. Samplers were deployed in galvanized cages for 21 days in Narragansett Bay, RI (USA) and solvent extracted upon recovery to analyze for legacy and emerging contaminants. For each contaminant, dissolved concentrations were calculated using measured passive sampler concentrations and sampler-water partition coefficients derived in the laboratory. Differences observed between dissolved concentrations obtained from PE and POM will be presented for polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs) and triclosan. This work will provide useful information for monitoring legacy and emerging contaminants in the water column of a temperate estuary and provide information to environmental managers for selecting types of passive samplers for deployment.