

Comparison of Passive Samplers for Monitoring Dissolved Organic Contaminants in Water Column Deployments

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Nonionic organic contaminants (NOCs) are difficult to measure in the water column due to their inherent chemical properties resulting in low water solubility and high particle activity. Traditional sampling methods require large quantities of water to be extracted and interference from colloids and/or small particles often exists. In recent years, passive samplers have been used to measure dissolved nonionic organic contaminants. The technique relies upon contaminant partitioning between the aqueous phase and the organic polymer of the passive sampler. The sampler accumulates NOCs resulting in greater analytical detection and measured contaminant concentrations in the sampler can then be used to calculate dissolved contaminant concentrations. In North America, several passive sampling materials are commonly used for NOCs, including solid phase microextraction (SPME) fibers, polyethylene devices (PEDs), and polyoxymethylene (POM). In this study, the utility and effectiveness of these sampling materials for monitoring water column concentrations of several contaminants were compared. Samplers were deployed in galvanized cages in Narragansett Bay, RI (USA) and solvent extracted to analyze for contaminants of concern. For each contaminant, sampler-water partition coefficients ($K_{\text{sampler-water}}$) needed to calculate dissolved NOC concentrations from measured passive sampler concentrations were determined in the laboratory. Differences observed between the three samplers and $K_{\text{sampler-water}}$ values will be presented for polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), and the emerging contaminant triclosan. Results from this work will provide useful information for monitoring legacy and emerging contaminants in natural waters.