**Measuring diffusion and polymer/water partition coefficients of halogenated flame retardants in silicone rubber polymer: parameters for passive sampling in water**

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Passive sampling techniques are used as a tool for measuring freely dissolved concentrations of many chemicals in the aquatic environment. This approach is especially useful for monitoring compounds present in water at sub ng/l concentrations, which would otherwise require sampling of large volume of water to achieve required limit of detection. Moreover, freely dissolved concentrations derived from passive sampling are better related to the exposure risk that aquatic organisms experience than total concentrations measured by most other sampling techniques. Many non-polar chemicals can be sampled by silicone rubber passive samplers, based on poly-dimethylsiloxane.

In case samplers are in equilibrium with e.g. sampled water sampler-water partition coefficient (Ksw) are required to derive the concentration of a chemical in the water phase from the amount accumulated in the sampler. In case no equilibrium is attained aqueous concentration can be estimated by sampler water exchange models that can be in situ calibrated from the release of performance reference compounds (PRCs) dosed to the sampler prior to exposure (Rusina et al., 2010). Such models consider that uptake is controlled by the water boundary layer (WBL) at the surface of the sampler. Consequently their application requires that internal transport resistance is sufficiently low, i.e. does not limit the uptake rate. This can be confirmed by measuring the diffusion coefficients inside the sampler material.

The diffusion and partition coefficients have been measured for a number of halogenated flame retardants, namely polybrominated diphenyl ethers (PBDEs), novel brominated flame retardants (NBFRs), dechlorane plus (DP), hexabromocyclododecane (HBCD) and tetrabromobisphenol A (TBBPA). Measurement of diffusion coefficients was performed by “film-staking method” (Rusina et al., 2010). Measurement of polymer/water partition coefficients was performed by “co-solvent” method (Smedes et al., 2009).

The preliminary results indicate that for the majority of compounds measured D values for in silicone rubber were related to compound properties and structure. The measured D values are in line with the models that estimate the magnitude of D from the molecular size/molecular total surface area (TSA). At the moment of abstract submission, measurement of *K*sw values is still ongoing.

The available values of diffusion and partition coefficient allowed to evaluate in which cases the compound diffusion in polymer may control the uptake and the generally applied WBL models are not applicable. Obtained *K*sw values can be appled to derive aquous concentrations in equilibrium passive sampling methods.

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