Session: Applying Bioaccumulation Data to Better Inform Human and Ecological Risk Assessment of Chemicals (P)
Poster
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Application of trophic magnification factors (TMFs) under the Water Framework Directive: some practical advice on selecting and determining a TMF

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Directive 2013/39/EU amending and updating the Water Framework Directive (2000/60/EC) and its Daughter Directive (the socalled EQS Directive: 2008/105/EC) sets Environmental Quality Standards for biota (EQS biota) for a number of bioaccumulative chemicals which can pose a threat to both aquatic wildlife (piscivorous birds and mammals) and human health via the consumption of contaminated prey or the intake of contaminated food originating from the aquatic environment. Member States (MS) of the European Union will need to establish programs to monitor the concentration of 11 priority substances in biota and assess compliance against these new standards for surface water classification. The biota standards essentially refer to fish and should be applied to the trophic level (TL) at which contaminant concentrations peak, so that the predator of the species at that TL is exposed to the highest contaminant levels in its food. For chemicals that are subject to biomagnification, the peak concentrations are theoretically attained at TL 3 to 4 in freshwater food webs and TL 5 in marine food webs, where the risk of secondary poisoning of top predators should also be considered. An EU-wide guidance effectively addresses the implementation of EQS Biota (EC 2014). Flexibility is allowed in the choice of target species used for monitoring because of the diversity of both habitats and aquatic community composition across Europe. According to that guidance, the consistency and comparability of monitoring data across MS should be enhanced by adjusting the data on biota contaminant concentrations to a standard trophic level using the appropriate TMF. In this context, the selection of a TMF value for a given substance is a critical issue, since this field-derived measure of trophic magnification can show an appreciable amount of variability, related to the characteristics of ecosystems, the biology of organisms, the physicochemical properties of contaminants, the experimental

design, and statistical methods used for TMF calculation, etc. In this presentation, guidance is given for the selection of TMFs for reliable applications within the context of the WFD (i.e. adjustment of monitoring data and EQS derivation). Based on a series of quality attributes for TMFs, a decision-tree is developed to help end-users select the “most reasonable” TMF.
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