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Environmental Quality Through Transdisciplinary Collaboration

ABSTRACT BOOK

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Society of Environmental Toxicology and Chemistry Europe (SETAC Europe)

ABSTRACT BOOK
SETAC Europe 27th Annual Meeting

TABLE OF CONTENTS

This book compiles the abstracts from the platform and poster session presentations at the 27th Annual Meeting of the Society of Environmental Toxicology and Chemistry Europe (SETAC Europe), held at Square conference centre, Brussels, Belgium, from 7–11 May 2017. The abstracts are reproduced as submitted by the author and accepted by the Scientific Committee. They appear in order of abstract code and alphabetical order per presentation type. The poster spotlight abstracts are included in the list of poster abstracts. The presenting author of each abstract is underlined.

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SOCIETY OF ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY
In the 1970s, no forum existed for interdisciplinary communication among environmental scientists, biologists, chemists, toxicologists, managers, engineers or others interested in environmental issues. The Society of Environmental Toxicology and Chemistry (SETAC) was founded in North America in 1979 to fill the void, and quickly saw dynamic growth in the Society's membership, meeting attendance and publications.

A unique strength of SETAC is its commitment to balance the scientific interests of government, academia and business. The Society by-laws mandate equal representation from these three sectors for officers of the World Council and Geographic Unit Boards of Directors and Councils, and in the composition of committees and other society activities. The proportion of members from each of the three sectors has remained nearly equal over the years.

substances such as antibiotics and fungicides may negatively affect the latter group of organisms via both waterborne exposure and their diet. The diet-related pathway includes the dietary exposure towards antimicrobials adsorbed to leaf material as well as effects on leaf-associated fungi, on which shredders' nutrition heavily relies (i.e., microbial conditioning). To expand the limited understanding of the importance of these two effect pathways, we examined the effects of the antibiotic ciprofloxacin (CIP) and the fungicide azoxystrobin (AZO) on the amphipod model shredder *Gammarus fossarum*. In separate experiments, gammarids' leaf consumption and physiological fitness were assessed using a 2x2-factorial test design: amphipods were fed leaf material microbially conditioned in the presence or absence of CIP (500 μg/L) or AZO (30 μg/L). At the same time, *G. fossarum* was either cultured in antimicrobial-free medium or was directly exposed towards the respective antimicrobial agent for 24 d. In comparison to the control, gammarids' leaf consumption and growth were increased (~17%, ~54%) when the food was conditioned in the presence of CIP. This is most likely explained by CIP-induced negative effects on leaf-associated bacteria, releasing fungi from competitive pressure, which may have triggered an enhanced food quality. In contrast, no diet-related effects where observed in the AZO experiment, whereas waterborne exposure reduced the shredder's survival (~50%). Moreover, animals surviving until the termination of the experiment showed an impaired leaf consumption (~40%) and feces production (~41%) as well as a negative growth when subjected to waterborne exposure. Thus, we showed that both antibiotics and fungicides can affect shredders' physiology with potential implications in their population dynamics and functioning. Moreover, these substance classes differ strongly regarding their effect direction and the relevance of the assessed effect pathways (i.e., waterborne vs. diet-related). As both substance classes can co-occur in aquatic ecosystems, a sensible next step would be to assess their combined effects to receive a more holistic picture of how antimicrobials affect key players in aquatic ecosystem functioning.

TU148

ASSESSMENT OF PRIORITY ANTIBIOTICS AS A PHARMACEUTICAL POLLUTANTS FOR UKRAINE

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The objective of our study - determination of predicted environmental concentration (PEC) of priority pharmaceuticals pollutants of surface waters in Ukraine among antibiotics. \nIn Ukraine research of pharmaceuticals in surface waters has not been carry out yet. Growing concern over global pharmaceutical pollution causes to study this issue in Ukraine too. As the basic formula for calculation PEC in surface water we used well-known methodology by Besse J.P.\nWe carried out a modification of this formula. In the calculation we used WHO data of health statistics (ATC/DDD system proposed by WHO). The ATC/DDD system is a tool for provision of reliable and comparable data for our understanding of national pharmaceutical markets. Overall consumption of medicines has expressed as defined daily doses (DDD) API per 1 000 inhabitants and per day (DIDs).\nUsing this approach we calculated value of PEC / PNEC for antibiotics that most consumed in Ukraine. Antibiotics amoxicillin, ciprofloxacin and sulfamethoxazole have highest priority as pharmaceutical pollutants representing a risk of negative impact on the environment in Ukraine.

Applying Bioaccumulation Data to Better Inform Human and Ecological Risk Assessment of Chemicals (P)

TU149

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 so-called 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.

TU150

Bioaccumulation and Effects of Emerging Contaminants in the Aquatic Organism Brown Trout

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Emerging contaminants have been ubiquitously detected in effluent from wastewater treatment plants (WWTPs) worldwide. Emerging contaminants may bioaccumulate in aquatic organisms such as fish, and subsequently enter the food chain, potentially posing a human health risk. In this study, the impact of contaminants in WWTP effluents with respect to accumulation in the aquatic vertebrate fish was investigated. First, a priority list of emerging contaminants in the aquatic environment was compiled, based on the frequency and level of occurrence as well as their toxic potencies, and included pesticides, pharmaceuticals, biocides, and industrial chemicals. Second, a sensitive and selective method involving quick, easy, cheap, effective, rugged, and safe (QuEChERS) extraction and online-solid phase extraction combined with liquid chromatography high resolution tandem mass spectrometry was developed to quantify 61 emerging contaminants in fish tissue. Finally, the method was successfully applied to wild fish samples collected from upstream and downstream of several WWTPs in Switzerland. Apparent bioaccumulation factors were calculated based on the ratio of the internal concentration in fish tissue over that analyzed in water. Furthermore, the bioaccumulation of these emerging contaminants was correlated to the biomarker gene expression level from genes covering all phases of cellular detoxification to get insight into the effects of WWTPs effluent. The findings of this study may have important implications for both the scientific community and policy makers in addressing the safety concerns of the emerging contaminants.

TU151

Derivation and Evaluation of Partitioning Properties for the Bioaccumulation Assessment of CMP Priority Ionogenic Substances

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Environment and Climate Change Canada (ECCC) recently published an approach for classifying the risk of organic chemicals using weight of evidence driven chemical profiling. The *Ecological Risk Classification System* (ERC) prioritizes substances that may be of higher concern from a combination of high potency and high probability of exposure (ECCC 2016, http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=A96E2E98-1). Among the organic chemicals ranked for further assessment using the new ERC approach, it was found that ~50 (unique CAS numbers) with surfactant properties were considered high or moderate priority. Another ~45 chemicals with surfactant properties were considered low priority. Surfactants are challenging chemicals for any level of risk assessment modeling, since most are ionizable organic chemicals (IOCs) and the current suite of risk assessment tools are not developed to deal with the predominant ionic form of such chemicals. Consequently, methods and algorithms to derive logP are not amenable to most types of surfactants. A key element in modeling the bioconcentration factor of ionogenic compounds is to specifically include the water-phospholipid partition coefficient (K_{plipw}) of the ionic