



# SETAC Europe 28<sup>th</sup> Annual Meeting

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## ABSTRACT BOOK

Responsible and Innovative Research for Environmental Quality

perfluorates, PBDEs, PCBs, HAPs and pesticides. In parallel with analytical methods, YES and YAS bioassays were conducted in order to quantify estrogenic and androgenic activities in surface waters. Antagonist activities were also evaluated. Over 71 river samples (concerning 24 river sampling points from the regional monitoring network), estrogenic activity was detected and quantified in 53 samples and could reach levels up to 11.7 ng E2eq/l (mean: 2.1±1.6 ng E2eq/l). Androgenic activity was never detected. On the other hand, estrogenic and androgenic antagonist activities were detected in 42 % and 55 % of the samples, respectively. When the estrogenic activity is compared to the EU-Watch List EQS for E2 (0.4 ng/l), 60 % of the samples exceed this value. The estrogenic activity was compared to the chemical results. A good correlation was found with the estrone concentration but also with other ED (e.g. bisphenol A, perfluorates). This study is, in a way, the first attempt in Wallonia to follow the *recommendations for the use of effect-based methods (EBM) for monitoring of estrogens in surface waters* emanating from the Science to Policy Interface (SPI) Estrogen monitoring project. These recommendations were presented at the last EU-WG chemicals held in October 2017 and this would possibly lead to the introduction of EBM in regulatory monitoring under the Water Framework Directive (WFD), especially for estrogens.

### TU313

#### Ecotoxicological tools to assess the impact pollution of tributaries to the Alqueva Reservoir (Southern Portugal)

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Degradation of surface waters and biodiversity loss at different spatial and temporal scales occurs through multiple stressors whose effects are difficult to separate and identify. Efficient management of water bodies depends on the development and selection of robust, sensitive and easily applicable tools that allow prioritizing the pressures and stressors that act in a basin, and mitigate their effects. The Alqueva reservoir constitutes the most important water supply source in southern Portugal, a semi-arid region with high levels of water scarcity and where agriculture is one of the main activities. The aim of the present study was to assess the use of an ecotoxicological tool-box in tributaries of the Alqueva reservoir for detecting chemical alterations that may influence the water quality of the reservoir. Water samples were collected along 2017 at four tributaries of Alqueva (streams of Zebro, Álamos, Amieira and Lucefécit) and analyzed for: (i) physical chemical support elements (pH, temperature, dissolved oxygen, conductivity, chloride, total phosphorus, Kjeldahl nitrogen, ammonium, nitrite, nitrate, BOD, COD), (ii) hazardous substances (pesticides), and (iii) ecotoxicological endpoints, using bioindicators representing different trophic levels (*Vibrio fischeri*, *Thamnocephalus platyurus*, *Daphnia magna*). In general, Zebro and Lucefécit presented concentrations of BOD (Zebro: 4.0-35.5 mg L<sup>-1</sup>; Lucefécit: 2.3-7.5 mg L<sup>-1</sup>) and total phosphorus (Zebro: 0.18-6.23 mg L<sup>-1</sup>; Lucefécit: 0.02-1.92 mg L<sup>-1</sup>) that compromise the support of biological life, with regard to nutrient and oxygenation conditions. As regards pesticides, the concentrations detected were low, being bentazone the compound quantified at highest levels. Lucefécit was the tributary that presented higher concentrations of pesticides (with values of bentazone of 1.94 µg L<sup>-1</sup>), probably due to the intensive agriculture crops around it. Concerning to ecotoxicological analysis, the results highlighted the toxicity in sublethal parameters (reproduction, feed inhibition or growth inhibition) induced, mainly, by samples from Zebro and Lucefécit streams. So, the results from the ecotoxicological tool-box allowed identifying the streams that promote a higher chemical impact to the reservoir, which is essential to delineate management actions to improve the water quality of the reservoir.

### TU314

#### Effects based tools for use in conjunction with passive samplers

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As part of an ongoing review of the Water Framework Directive (WFD), the European Commission (EC) is considering "effects based tools" (EBTs) for use as an alternative to, or in combination with, the monitoring of individual substance concentrations. There are several ways in which EBTs may be integrated into environmental monitoring but one approach, which integrates chemical exposure over time, is to conduct toxicity profiling on extracts from passive samplers deployed in surface waters. The aim of this project was to provide a critical evaluation of available EBTs that could be used in conjunction with passive samplers, and propose a list of assays for use in monitoring surface waters associated with the oil and gas industry. A list of possible EBTs was compiled based on recent published reviews on this topic. These assays were then broadly screened based on commercial availability, general validation maturity, previous

application to environmental samples, and suitability for use with passive sampler extracts to derive a short list of 22 assays for more detailed consideration. The short-listed assays included novel whole organism bioassays (or surrogates), and *in vitro* or bacterial assays for endpoints based on endocrine disruption (oestrogen, androgen and thyroid), genotoxicity, oxidative stress, and metabolism of polyaromatic hydrocarbons (PAHs). Commonly used whole-organism assays (e.g. acute invertebrate, algae and fish tests) were not subject to this screening, since they are already well proven and no detailed evaluation was required, however, they were considered as part of the final recommendations. The shortlisted EBTs were then subject to a detailed review, based on the published scientific literature, to identify relevant information with respect to their performance, interpretation, and application. The EBTs were compared using the information identified in the literature reviews and an initial suite of thirteen bioassays were recommended for the monitoring of surface waters associated with refinery effluents using passive sampler extracts. This recommended suite of EBTs should be considered a starting point for use in the monitoring of waters receiving refinery effluents, to be further developed based on experience in using the assays for this purpose, and incorporating new relevant bioassays once they have achieved a sufficient level of validation maturity. This review will be published as a Concawe report in 2018.

### TU315

#### Innovative ecotoxicological monitoring strategies for the protection of aquatic ecosystems and the implementation of the Water Framework Directive (WFD)

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The Water Framework Directive (WFD, 2000/60/EC) regulates the European water policy and addresses the EU member states to achieve good qualitative and quantitative status of all water bodies. Despite the efforts to reduce the release of chemicals into the aquatic environments, pollution is still widespread across Europe, and new emerging substances should be assessed and managed. The general goal of this project (realised in the framework of the 'Torno subito' Lazio Operational Programme European Social Funding 2014-2020) is to select and define innovative methods to assess the toxicity due to the exposure to different pollutants, especially the emerging substances and respective mixtures, with a focus on aquatic ecosystems and human health. This goal has been achieved, in a first step, by making a literature review on the priority and emerging substances widespread in the aquatic environment, to investigate their effects on the development of zebrafish (*Danio rerio*) embryos. Then, a few toxic substances that are relevant for our goals have been selected and analysed through the fish embryo acute toxicity test (FET) and other assays; particular attention has been given to the sub-lethal effects. Afterwards, environmental samples from different aquatic systems in Italy will be analysed to detect the chemicals present in these sites as well as their toxic effects. In order to reach a better comprehension of the effects of such substances on the ecosystems, bioassays with other organisms from different trophic levels (bacteria algae, daphnids) will also be performed. The study will ultimately aim to provide recommendations for the implementation and the update of the monitoring strategies of the WFD, as well as to enhance the current EU activity on Effect-Based Methods.

### TU316

#### Chemical and Ecotoxicological Monitoring of a marine coastal area in the Central Italy

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A monitoring campaign has been performed in Central Italy with the aim to characterize the chemical quality status of the coastal marine area in order to detect the possible impact of the emissions of a Coal fired power station and other sources of pollution in proximity of the city of Civitavecchia. The sampling has been carried out in two different seasons of the year along the marine coastal area and in a transitional surface waterbody (Saline di Tarquinia). The analysis has been performed in the water column and in the first 20 centimeters of the sediments. The chemical substances analyzed included several priority substances of the WFD (water framework directive) and other chemical substances: Metals, Dioxins, PCB, PAH, Naphthalene. The Ecotoxicological assays have been performed with the use of algae (*Phaeodactylum tricorutum*) and crustaceans (*Artemia franciscana* and *Tigriopus fulvus*). The results have showed a diffuse light exceedance of the sediment environmental quality standards of the Italian legislation for some metals (e.g. arsenic, lead, chromium, mercury) and naphthalene; the data of the water column are in general below the environmental quality standards, but Uranium has been detected in surface water samples at concentrations above the available PNEC