CIESM Congress Session : Ecotoxicology / field studies

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Moderator's Synthesis

The moderator opened the session with a brief introduction, consisting of her personal view on interesting topics in this area of research. The following research topics were presented:

• Contaminants of emerging concern (e.g. replacement products of banned chemicals, “pseudo-persistent” chemicals such as personal care products and pharmaceuticals) [1,2]
• Mixture toxicity (e.g. concentration addition and the case of additive solubilities of solid chemicals) [3,4]
• Litter/microplastics (exceeding OSPAR’s Ecological Quality Objective, even in remote areas) [5]
• Passive sampling/passive dosing (promising techniques in exposure and toxicity tests) [6,7]
• Food chain accumulation and biomagnification (lack of process understanding) [8]
• Seven snapshot presentations were given in this session, the majority studying biomarker responses in bivalves and fish. The general discussion covered the following items:
• Specificity of biomarkers: A positive signal has to be a true sign of an effect. It is not always possible to relate the signal to a specific cause. This is particularly challenging in the complex situation of field studies where biomarker responses can be influenced by biological and environmental factors. [9]
• Threshold levels in marine monitoring: The assessment of the environmental status usually involves a threshold value. These threshold levels are derived from (eco)toxicological data, but data gaps and/or conflicting data exist, with potential consequences for soundness and applicability of these values. [10]
• Early warning systems: Ecotoxicological studies can indicate environmental problems, which need to be followed up by chemists for compound identification and quantification. This calls for enhanced collaboration between these disciplines.
• Effect-directed analyses: Promising tool on the interface ecotoxicology/chemistry where a sequence of fractionations reduces complexity of a sample. Biological tests and chemicals analyses of each fraction aim to establish and confirm cause-effect relationships. [11]

References:
[1] Vorkamp et al., 2015, Environ. Poll. 196, 284.[2] Fabbri and Franzellitti, 2016, Environ. Toxicol. Chem. 35, 799. [3] Cedergren, 2014, PLoS One 9(5), e96580. [4] Smith et al., 2013, Environ. Sci. Technol. 47, 2026. [5] Avery-Gomm et al., 2012, Mar. Poll. Bull. 64, 1776. [6] Booij et al., 2016, Environ. Sci. Technol. 50, 3. [7] Smith et al., 2012, Environ. Sci. Technol. 46, 4852. [8] Norstrom and Muir, 1994, Sci. Total Environ. 154, 107. [9] Amiard-Triquet and Berthet, 2015, in: Amiard-Triquet et al. (eds.) Aquatic Ecotoxicology, Chapter 7, 153. [10] OSPAR, 2009, Background document on CEMP assessment criteria for QSR 2010, 461/2009. [11] Brack, 2003, Anal. Bioanal. Chem. 377, 397.

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