EMPIR Call 2018 – Health, SI Broader Scope, Normative and Research Potential

Selected Research Topic number: **SRT-n11**
Version: 4.0

Title: Metrology for monitoring endocrine disrupting compounds under the Water Framework Directive

Abstract

The Water Framework Directive (WFD) establishes a strategy for the protection and improvement of the aquatic environment and water quality in Europe. Among chemical pollutants of particular concern are endocrine disrupting compounds (EDCs) due to their environmental and public health effects. In 2013, a class of EDCs - natural and synthetic oestrogens - were introduced in the first WFD watch list of priority substances together with their possible methods of analysis and performance requirements. However, reliable harmonised methods that meet these requirements are still missing and urgently needed. Proposals are required to develop traceable measurement methods for the determination of the targeted EDCs and to ensure their transfer to normative bodies.

Keywords

EDC, oestrogens, estrogens, WFD, Water Directive, 2000/60/EC, 2013/39/EU, 2009/90/EC, Watch List, water quality, environment, public health, CEN/TC 230, ISO/TC 147

Background to the Metrological Challenges

Water is a crucial resource and to satisfy the demand for water quality, an ambitious set of European directives has been put in place under the umbrella of the WFD, Directive 2000/60/EC and its derivatives, to monitor and control the occurrence and concentrations of potentially polluting substances in the aquatic environment. Decision (EU) 2015/495 specifies a “Watch List” of priority substances pursuant to the WFD that must be monitored across Europe. Three hormones, also known as endocrine disrupting compounds (EDCs): 17-β-oestradiol (E2), 17-α-ethinyloestradiol (EE2) and oestrone (E1), were selected for inclusion in this first Watch List in order to facilitate the determination of appropriate measures to address the risk posed by those substances.

The monitoring of substances in the Watch List should generate high-quality data on their concentrations in the aquatic environment. However, the European Commission has identified that there is a lack of standardised methods to monitor oestrogens that meet the requirements of the Directive and its derivatives. There are currently no methods available to guarantee the integrity of samples between sampling and analysis, nor quality control tools to ensure reliability. The detection limits specified within the WFD are 0.035 ng/L for EE2 and 0.4 ng/L for E1 and E2. However, the lowest limit of quantification (LOQ) reported in the literature for E2 and EE2 is 0.05 ng/L.

In addition, there are no CEN or ISO standards currently available to address the measurement of EDCs by conventional chemical analysis. As such, each Member State has its own methodology for national monitoring. A new mechanism is therefore required to ensure that traceable measurements of EDCs to satisfy the requirements of the WFD are possible and well defined, and to ensure that measurements across Europe are comparable.

Objectives

Proposers should address the objectives stated below, which are based on the PRT submissions. Proposers may identify amendments to the objectives or choose to address a subset of them in order to maximise the overall impact, or address budgetary or scientific / technical constraints, but the reasons for this should be clearly stated in the protocol.

The JRP shall focus on the traceable measurement and characterisation of endocrine disrupting compounds, in particular oestrogens, to support the requirements of the European Water Framework Directive 2000/60/EC

and associated Environmental Quality Standards Directive 2013/39/EU and technical specifications 2009/90/EC.

The specific objectives are

1. To develop standardised methods and analytical techniques for the measurement of endocrine disrupting compounds (EDCs) that satisfy the requirements of the Water Framework Directive and using these to support the recognition of target EDCs as priority substances. Requirements include methods for several matrices (whole water, inland surface water) and the determination of accuracy, detection limit (0.035 ng/L for 17-alpha-ethinyloestradiol, 0.4 ng/L for oestrone and 17-beta-oestradiol) and uncertainty (less than 50 % at environmental quality standard level).
2. To develop validated sample preparation methods for EDCs demonstrating long-term stability in real matrices (i.e. including suspended particulate and colloidal matter), and quality control tools to enable reliable monitoring of these substances within Europe.
3. To evaluate the performance of the methods and techniques developed in objectives 1 and 2, via an inter-laboratory comparison with accredited laboratories that are currently involved in routine monitoring to ensure that the outputs of the project are suitable for their application.
4. To collaborate with the technical committees CEN/TC 230 Water Analysis, ISO/TC 147 Water Quality and European Commission Chemicals working group and the users of the standards they develop to ensure that the outputs of the project are aligned with their needs, including the provision of a technical report on the monitoring of EDCs that could be incorporated into future standards.

The proposed research shall be justified by clear reference to the measurement needs within strategic documents published by the relevant Regulatory body or Standards Developing Organisation or by a letter signed by the convenor of the respective TC/WG. EURAMET encourages proposals that include representatives from industry, regulators and standardisation bodies actively participating in the projects. The proposal must name a “Chief Stakeholder”, not a member of the consortium, but a representative of the user community that will benefit from the proposed work. The “Chief Stakeholder” should write a letter of support explaining how their organisation will make use of the outcomes from the research, be consulted regularly by the consortium during the project to ensure that the planned outcomes are still relevant, and be prepared to report to EURAMET on the benefits they have gained from the project.

Proposers should establish the current state of the art, and explain how their proposed research goes beyond this.

EURAMET expects the average EU Contribution for the selected JRPs in this TP to be 0.6 M€, and has defined an upper limit of 0.8 M€ for this project.

EURAMET also expects the EU Contribution to the external funded partners to not exceed 30 % of the total EU Contribution across all selected projects in this TP.

Any industrial partners that will receive significant benefit from the results of the proposed project are expected to be unfunded partners.

Potential Impact

Proposals must demonstrate adequate and appropriate participation/links to the “end user” community, describing how the project partners will engage with relevant communities during the project to facilitate knowledge transfer and accelerate the uptake of project outputs. Evidence of support from the “end user” community (e.g. letters of support) is also encouraged.

You should detail how your JRP results are going to:

- Address the SRT objectives and deliver solutions to the documented needs,
- Feed into the development of urgent documentary standards through appropriate standards bodies,
- Transfer knowledge to the industry sector.

You should detail other impacts of your proposed JRP as specified in the document “Guide 4: Writing Joint Research Projects (JRPs)”

You should also detail how your approach to realising the objectives will further the aim of EMPIR to develop a coherent approach at the European level in the field of metrology and include the best available contributions from across the metrology community. Specifically, the opportunities for:

- improvement of the efficiency of use of available resources to better meet metrological needs and to assure the traceability of national standards
- the metrology capacity of EURAMET Member States whose metrology programmes are at an early stage of development to be increased
- organisations other than NMIs and DIs to be involved in the work

Time-scale

The project should be of up to 3 years duration.