

Title: Matrix reference materials for environmental analysis

Abstract

Reliable analysis of chemical indicators in water, sediment and soil samples for assessing environmental pollution is a significant challenge for analytical chemistry because of the complexity of the sample matrix and low concentration of pollutants. Target compounds include organics (pesticides, PAHs, PCBs, etc.) and heavy metals (Hg, Cd, Ni, Pb and As). Laboratories performing sampling and tests in this field are regulated by EU directives, and need appropriate matrix certified reference materials (CRMs) to demonstrate traceability, however suitable CRMs are not always readily available locally.

Keywords

Environmental pollution, organics, heavy metals, matrix CRMs, quality control, target parameters

Background to the Metrological Challenges

Drinking water, soil used for the cultivation of agricultural products, plant and animal habitats are all at risk from pollution or contamination from, for example, organics or heavy metals. Increased industrialisation, the use of chemicals in agriculture and the consumption of fossil fuels drive a greater need for monitoring environmental pollution. Establishing a quality system for the testing of environmental samples requires appropriate calibrators i.e. matrix CRMs representing typical samples in the geomorphological and anthropological sense. Given the complexity and instability of environmental samples such reference materials can be difficult to obtain and NMIs / DIs need to be able to develop and validate those required in their localities.

An NMI or DI wishing to establish a research capacity in this area would do so through the improvement and validation of their procedures for preparing such samples. These activities would build on the experience of more developed NMIs, using their expertise to optimise the system for the particular needs of that country. The validation process would involve the NMI establishing the capability participating in comparisons and analysis of uncertainties with others establishing similar facilities and those with long established facilities. The whole process would result in both the development of the procedures, the development of the relevant staff and the development of relationships between the establishing NMI and more experienced researchers in the field which would foster further joint research activities beyond the life of the project.

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 proposal.

The JRP shall focus on the development of metrological research capacity in the preparation of reference materials.

The specific objectives are

1. For the participating countries wishing to develop research capabilities in heavy metal reference materials, to develop procedures for the preparation of water/waste and soil/sediment water matrix samples containing certified amounts (with stated measurement uncertainty) of relevant heavy metals.
2. For the participating countries wishing to develop research capabilities in organic pollutant reference materials, to develop procedures for the preparation of water/waste and

soil/sediment water matrix samples containing certified amounts (with stated measurement uncertainty) of relevant organics.

3. For each participant to develop an individual strategy for the long-term development of their research capability in certified reference materials for environmental pollution including priorities for collaborations with the research community in their country, the establishment of appropriate quality schemes and accreditation (e.g. participation in key comparisons, the entry of CMCs into the BIPM database, accreditation to ISO/IEC 17025). They should also develop a strategy for offering services from the established facilities to their own country and neighbouring countries. The individual strategies should be discussed within the consortium and with other EURAMET NMIs/DIs, to ensure that a coordinated and optimised approach to the development of traceability in this field is developed for Europe as a whole.

Proposers shall give priority to work that meets documented metrological needs and activities that will lead to an improvement in European metrological capability and infrastructure beyond the lifetime of the project.

Proposers should establish the relevant current capability for research, and explain how their proposed project will develop capability beyond this.

EURAMET has defined an upper limit of 500 k€ for the EU Contribution to any project in this TP, and a minimum of 100 k€

EURAMET also expects the EU Contribution to the external funded partners to not exceed 10 % of the total EU Contribution to the project. Any deviation from this must be justified.

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,
- Provide a lasting improvement in the European metrological capability and infrastructure beyond the lifetime of the project,
- Facilitate improved industrial capability or improved quality of life for European citizens in terms of personal health or protection of the environment,
- Transfer knowledge to the environmental testing sector and the metrology community.

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

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.