



Protecting Europe's water resources

Water pollution has a significant negative impact on human health and the environment. Increasing demand from citizens and environmental organisations for cleaner rivers and lakes, groundwater and coastal beaches has led the European Commission to make water protection one of its priorities. The European Water Framework Directive (WFD) was established to protect and improve water quality and prevent further deterioration through legal limits on a wide range of known pollutants.

Europe's National Measurement Institutes working together

The European Metrology Research Programme (EMRP) brings together National Measurement Institutes in 23 countries to address key measurement challenges at a European level. It supports collaborative research to ensure that measurement science meets the future needs of industry and wider society.

Challenge

The WFD specifies a list of 33 priority water pollutants, for which maximum allowable concentrations have been defined – these are known as Environmental Quality Standards (EQS). EU member states are required to implement monitoring programs to ensure their water bodies comply with the EQS. Some of the priority pollutants identified by the WFD are toxic to a wide range of living organisms, making them liable to accumulate within the food chain. The permitted levels specified by the EQS for such pollutants are consequently very low.

One such toxic pollutant is tributyltin (TBT), a compound used in protective coatings for boats. The use of TBT is now strictly regulated, but TBT levels in the coastal waters of most developed countries remain high enough to pose a threat to living organisms. However, until recently, no standardised methods existed for detecting TBT in water at the low levels required by the EQS. Determining TBT levels from real water samples, as required by the EQS, is even more challenging due to the presence of other contaminants, such as suspended particles present in natural water. Accurate methods for measuring pollutants at low levels in real water samples were needed, to serve as a reference for test laboratories and underpin the requirements of the WFD.

Solution

The EMRP project *Traceable measurements for monitoring critical pollutants under the European Water Framework Directive* developed two such reference methods, based on different mass spectrometry techniques, for measuring TBT levels in real water samples. Both methods are traceable to the SI and meet the requirements of the WFD regarding the limit of quantification (which describes the smallest concentration that can be reliably measured) and measurement uncertainty. This enables testing labs to benchmark their methods, demonstrate compliance with the regulations, and perform water monitoring services more accurately, efficiently and economically.

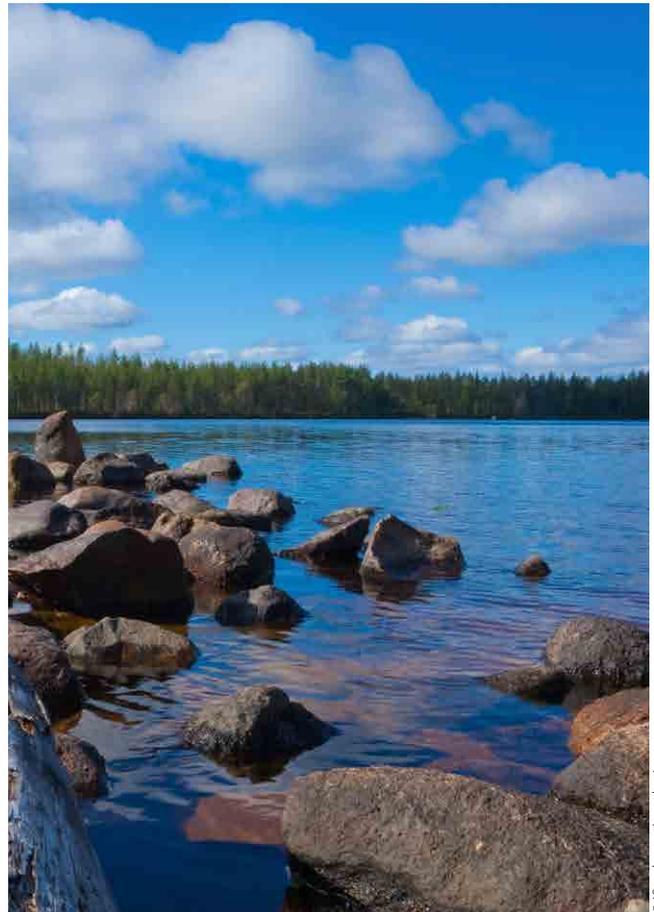
Impact

The improved method for TBT analysis developed in the EMRP project has already been adopted by IPROMA, an organisation contracted for water quality measurements by numerous Spanish Regional Authorities. IPROMA can now offer its clients an improved low-level TBT concentration test, enabling them to demonstrate that TBT levels in the open water systems used to supply cities and towns meet the requirements of the WFD. The new method is more efficient, requiring less time and labour, and costs 20% less to implement than its predecessor.

This improvement in measurement capability, along with other outputs of the project, will help ensure that levels of toxic pollutants in Europe's water resources are carefully monitored, protecting the public and environment.

Metrology in support of the Water Framework Directive

The EMRP project *Traceable measurements for monitoring critical pollutants under the European Water Framework Directive* was undertaken to support the implementation of the WFD and related directives, through improvements to the quality and comparability of data used to monitor the ecological status of Europe's inland water sources. The project developed primary reference methods for selected water pollutants, and produced new concepts for whole water reference materials and test materials that can meet the requirements of the legislation. The improvements will ensure long-term reliability and global comparability of water monitoring data obtained under the WFD and support better decision-making in the field of water management.



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