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# Towards better isotope ratio measurements

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Correct interpretation of isotope ratio results relies on the quality of the isotope ratio data. It also relies on a good estimation of the measurement uncertainty associated with such data. The quality of data can be assured via the use of certified reference materials (CRMs), validation of analytical methods and implementation of quality control and assurance procedures. In addition, the comparison of data within a single laboratory over extended time periods, or between different laboratories requires isotope ratio delta values to be comparable and traceable to the same reference. For laboratories with accreditation to an international standard such as ISO/IEC 17025, all of these quality aspects are familiar, however there are very few such laboratories 17025 accredited for light element stable isotope analysis. There is, therefore, a need for guidance tailored to isotope ratio analysis with regards to metrological and quality-related features of measurements.
Addressing this need has been a focus of isotope ratio analysis at LGC's National Measurement Laboratory, the UK's Designated Institute for chemical and bio-measurement, for several years. The poster will present a summary of this work and main achievements so far including:
• Production and characterisation for CRMs certified for absolute carbon isotope ratio, which provide the link between the relative VPDB isotope delta scale and the International System of Units (SI). These materials do not rely on pre-existing reference materials for value assignment.
• Proposal of minimum requirements for validation of stable isotope methods used for forensic purposes in collaboration with the Forensic Isotope Ratio Mass Spectrometry (FIRMS) Network in the form of a simple ten-point plan.
• Provision of customisable spreadsheet templates for measurement uncertainty estimation that can be tailored for specific applications and calculation approaches.
• Operation of an ISO/IEC 17043:2010 accredited Proficiency Testing (PT) scheme on behalf of the FIRMS Network for light element isotope delta values to underpin accreditation and external validation of methods.
• Coordination of an inter-laboratory exercise involving metrology institutes and expert forensic laboratories for the bulk carbon isotope ratio analysis of honey that demonstrated the need to report measurement uncertainty to ensure compatibility of results.
• Development of new approaches for mass bias correction for isotope ratio analysis by multicollector-inductively coupled plasma-mass spectrometry (MC-ICP-MS)
• Most recently, the publication of the Second Edition of the "Good Practice Guide for Isotope Ratio Mass Spectrometry" again in collaboration with the FIRMS Network.