

ISOTOPE DILUTION MASS SPECTROMETRY AS AN ORGANIC REFERENCE METHOD, A USERS GUIDE

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There is increasing international recognition of the need to improve the reliability and comparability of analytical measurements. This is particularly important for trade protection where technical barriers are becoming more frequently used. Many countries are working to develop improved chemical measurement systems and an important part of this process is the development of a national reference measurement capability.

The National Analytical Reference Laboratory (NARL) is working to apply isotope dilution mass spectrometry (IDMS) as a reference method for trace organic and inorganic analysis. IDMS has the potential to be a primary method of analysis providing high accuracy reference measurements with well defined uncertainty budgets. These methods are then available for the certification of reference materials specifically prepared for Australian analytical requirements.

Essentially IDMS involves measurement of the ratio of an analyte to an isotopically labelled internal standard. By careful preparation of the sample and a matched standard the method uncertainty is minimised. The central aspects of IDMS and its practical application as a reference method will be presented. Typical results from our experiences in numerous international comparisons for trace organic analysis will be discussed and the main sources of method uncertainty will be highlighted. From this overview the practical steps taken to minimise these areas of method uncertainty will be presented. Particular note will be made to instrumental effects that need to be addressed in order to optimise precision and accuracy. Areas of potential method bias will be discussed and finally aspects of analyte confirmation will be considered.
