OIV-MA-AS1-14 Recommendations on measurement uncertainty

Introduction

It is important that analysts are aware of the uncertainty associated with each analytical result and estimates of uncertainty. The measurement uncertainty may be derived by a number of procedures. Food analysis laboratories are required to be in control, use collaboratively tested methods when available, and verify their application before taking them into routine use. Such laboratories therefore have available to them a range of analytical data which can be used to estimate their measurement uncertainty.

Terminology

The accepted definition for Measurement Uncertainty[1] is:

"Parameter, associated with the result of a measurement, that characterises the dispersion of the values that could reasonably be attributed to the measurand.

NOTES:

1. The parameter may be, for example, a standard deviation (or a given multiple of it), or the half-width of an interval having a stated level of confidence.

2. Uncertainty of measurement comprises, in general, many components. Some of these components may be evaluated from the statistical distribution of results of a series of measurements and can be characterised by experimental standard deviations. The other components, which can also be characterised by standard deviations, are evaluated from assumed probability distributions based on experience or other information.

3. It is understood that the result of a measurement is the best estimate of the value of a measurand, and that all components of uncertainty, including those arising from systematic effects. Such as components associated with corrections and reference standards, contribute to the dispersion."

[It is recognised that the term "measurement uncertainty" is the most widely used term by International Organisations and Accreditation Agencies. However The Codex ALIMENTARIUS Committee on Methods of Analysis and Sampling has commented on a number of occasions that the term "Measurement Uncertainty"

has some negative associations in legal context and so has noted that an alternative, equivalent, term, "measurement reliability", may be used.]

Recommendations

The following recommendations are made to governments:

1. For OIV purposes the term “measurement uncertainty” or “measurement reliability” shall be used.

2. The measurement uncertainty or “measurement reliability” associated with all analytical results is to be estimated and must, on request be made available to the user (customer) of the results.

3. The measurement uncertainty or “measurement reliability” of an analytical result may be estimated in a number of procedures notably those described by ISO[1] and EURACHEM[2]. These documents recommend procedures based on a component-by-component approach, method validation data, internal quality control data and proficiency test data. The need to undertake an estimation of the measurement uncertainty or “Measurement reliability” using the ISO component-by-component approach is not necessary if the other forms of data are available and used to estimate the uncertainty or reliability. In many cases the overall uncertainty may be determined by an inter-laboratory (collaborative) study by a number of laboratories and a number of matrices by the IUPAC/ISO/AOAC INTERNATIONAL[3] or by the ISO 5725 Protocols[4].

References

- “Guide to the Expression of Uncertainty in Measurement”, ISO, Geneva, 1993.
- EURACHEM/CITAC Guide Quantifying Uncertainty In Analytical Measurement (Second Edition), EURACHEM Secretariat, HAM, Berlin, 2000. This is available as a free download from http://www.vtt.fi/ket/eurachem.
- “Protocol for the Design, Conduct and Interpretation of Method Performance Studies”, ed. W. Horwitz, Pure Appl. Chem., 1995, 67, 331-343.
- “Precision of Test Methods”, Geneva, 1994, ISO 5725, Previous editions were published in 1981 and 1986.