

Use of surplus proficiency test items

Introduction

Test items are sometimes available from proficiency testing (PT) providers after the completion of a PT round. The purpose of this information leaflet is to advise laboratories on benefits and limitations of surplus PT items.

Potential uses

Surplus PT items have a number of potential uses including:

- Assessing new analytical methods/instrumentation and verifying their correct implementation;
- Training of analysts;
- Assessing the likely performance in a PT scheme;
- Method/instrument trouble-shooting and reassessing analytical performance following poor performance in a PT round;
- As quality control (QC) samples.



General considerations

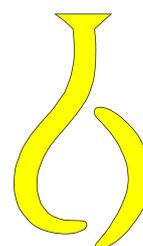
The following factors should be considered prior to use of surplus PT items:

- Check whether any relevant accompanying information is available and meets end-user requirements, e.g. the assigned value and its associated uncertainty for the parameter(s) of interest;
- Assess their physical suitability and ensure that the matrix is appropriate. Some PT items have compositions close to that of routine samples, while others are synthetic or fortified (spiked). This may influence the suitability of the PT item for assessing different stages of the analytical method;
- Check their availability. Surplus PT items may only be available in small numbers which will limit their usefulness for repeated testing over time, for example, as QC samples;
- Assess the stability information provided. PT items must be stable during the conduct of a round but there is no requirement for them to be assessed for stability following the completion of the round. The PT provider may be able to provide additional stability data or storage requirements, otherwise further evaluations by the end-user will be necessary.

Usefulness of accompanying PT data

At the end of a PT round an assigned value is provided for each parameter, and participants' performances are judged against a predefined performance acceptability criterion, for example, using a z-score [1]. This information can support the use of surplus test items provided the following points are considered:

- If the assigned value is a consensus value, end users may need to reflect on the methods/analytical techniques used to derive it;



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- Whether the metrological traceability of the assigned values makes them suitable for assessing measurement bias, for example if derived from a known spike value or a measurement made with a primary method;
- Whether the PT provider's performance evaluation criteria agree with the fitness-for-purpose criteria required by the end-user. If so, the PT scheme criteria can be used as quality control criteria when using surplus material. If not, the end-user will need to consider setting their own performance criteria [2].

Case study - Use of surplus PT items when implementing a standard method

A laboratory wishes to adopt the standard method EN 15763 for the determination of the mass fraction of cadmium in foodstuffs by ICP-MS after microwave digestion. For the purpose, five PT items with different matrices and concentration levels were obtained from a PT provider and analysed in duplicate.

The laboratory i) verifies that the average of the replicates falls within the satisfactory performance range for the respective PT rounds ($z\text{-score} \leq |2|$) and ii) checks that the observed difference between the duplicates does not exceed the stated repeatability limit (r) of the standard method.

The data below confirms that the laboratory can operate the method correctly.

| Matrix | Form | Average of duplicates (mg/kg) | Satisfactory range (mg/kg) | Difference between duplicates (mg/kg) | Repeatability limit, r (mg/kg) |
|----------------|--------------|-------------------------------|----------------------------|---------------------------------------|----------------------------------|
| Fish muscle | Frozen | 0.076 | 0.041 - 0.109 | 0.006 | 0.020 |
| Tomato passata | Liquid | 0.187 | 0.148 - 0.224 | 0.011 | 0.014 |
| Chocolate | Pellets | 0.304 | 0.187 - 0.419 | 0.017 | 0.022 |
| Bovine liver | Frozen | 0.636 | 0.392 - 0.808 | 0.015 | 0.048 |
| Seaweed | Freeze-dried | 1.84 | 1.57 - 2.79 | 0.17 | 0.20 |

More information / further reading

- [1] Eurachem Information Leaflet: How can proficiency testing help my laboratory? (2013), available from www.eurachem.org
- [2] B. Magnusson and U. Örnemark (eds.) Eurachem Guide: The Fitness for Purpose of Analytical Methods – A Laboratory Guide to Method Validation and Related Topics, (2nd ed. 2014). ISBN 978-91-87461-59-0, available from www.eurachem.org

Information about PT providers and schemes can be obtained from your national accreditation body, from the EPTIS website (www.eptis.org) or from other national or international organizations.