

# Elemental Analysis Manual

## for Food and Related Products

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## 4.0.1 Terminology

Version 1.0 (June 2008)  
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### GLOSSARY

#### 4.0.1.1 SAMPLES AND SOLUTIONS

- (1) Sample—portion of material selected from a larger quantity of material<sup>1</sup>.
- (2) Laboratory sample—sample or subsample sent to or received by the laboratory<sup>1</sup>.
- (3) Analytical (or test) sample—sample, prepared from the laboratory sample (by homogenization, grinding, blending, etc.), from which analytical portions are removed for analysis<sup>1</sup>.

- (4) Analytical (or test) portion—quantity of material removed from the analytical sample for analysis<sup>1</sup>.
- (5) Analytical (or test) solution—solution prepared by digestion of an analytical portion and diluting to a fixed volume<sup>1</sup> or solution obtained by leaching a test vessel.
- (6) Leach solution—solution obtained by leaching a foodware test vessel.

#### 4.0.1.2 STANDARD SOLUTIONS

- (1) Stock standard solution—a solution containing a high concentration of one or more analytes prepared in the laboratory using assayed high purity materials or purchased from a reputable commercial source. Stock standard solutions are used to prepare standard solutions and other needed analyte solutions.
- (2) Intermediate standard solution—a solution containing one or more analytes prepared in the laboratory by diluting an aliquot of stock standard solution or purchased from a reputable commercial source. The intermediate standard solution is used for further dilutions to prepare standard solutions and possibly for fortifications of FMBs, FAPs or FASs.
- (3) Standard solution—a solution prepared from the dilution of stock standard or intermediate standard solutions. Standard solutions are used to standardize instrument response with respect to analyte concentration.
- (4) Standard blank— zero concentration standard solution prepared with the same matrix as standard solutions but without the addition of analyte. Standard blank is used for instrument standardization and may be used to verify absence of analyte carry-over during instrumental measurements.

#### 4.0.1.3 METHOD PERFORMANCE

- (1) Check solution (CS)—a solution of method analytes of known concentration that is analyzed periodically during and at the end of the analytical run. The check solution is analyzed to verify the stability of standardization during the analytical run and that carry-over did not occur. One of the standard solutions at the mid-concentration range is typically used for this purpose.
- (2) Fortified analytical portion (FAP)—analytical portion that was subjected to fortification (spiking) with analyte before digestion. The purpose of the FAP is to determine if the preparation procedure or sample matrix contribute bias to the analytical result.
- (3) Fortified method blank (FMB)—MBK that was subjected to fortification (spiking) with analyte(s) before digestion. The purpose of the FMB is to determine if the fortification and analysis methodology is in control.
- (4) Fortified analytical solution (FAS)—analytical solution that is subject to fortification (spiking) with analyte before instrumental determination of analyte concentration. The purpose of the FAS is to determine the need for further dilution of the analytical solution based on the matrix effects that may be present.
- (5) Independent check solution (ICS)—a solution of method analytes of known concentration prepared or obtained from a source external to the laboratory and different from the

source used for instrument standardization. The ICS is used to ensure a valid standardization and check instrument performance. Use of a commercial source material with a different lot number is acceptable, but a source material from a different manufacturer is preferred.

- (6) Method blank (MBK)—solution that is made from all method reagents, and exposed to all laboratory ware, apparatus, equipment, and carried through the entire analytical procedure in the same manner as an analytical portion or test vessel. The MBK is analyzed to ensure analytes have not significantly been added to the analytical solution from the analytical procedure and laboratory environment.
- (7) Reference material (RM)— materials closely related to the sample matrix that have a reference value concentration for the analyte of interest.

#### 4.0.1.4 OTHER

- (1) Batch—a group of analytical portions processed in a continuous sequence under relatively stable conditions. Generally, a batch includes the maximum number of samples and associated quality control materials that can be analyzed efficiently, maintained for sample integrity, and evaluated effectively for quality assurance. Specifically:
  - Method is constant
  - Instrument and its conditions (*i.e.*, pertinent operating parameters) are constant
  - Standardization is constant, except for methods in which standardization is performed for each analytical solution (*i.e.*, method of standard additions).
- (2) Matrix modifier—a substance added to the graphite tube platform along with the analytical solution in order to minimize matrix interference by selective volatilization of either the matrix or analyte components. Used with graphite furnace atomic absorption spectrometry.

## REFERENCES

- (1) Horwitz, W. (1990) Nomenclature for Sampling in Analytical Chemistry (Recommendations 1990), *Pure Appl. Chem.* **62** 1193-1208.