

HARMONIZATION OF NAMES FOR PRINCIPLES IN CXS 234-1999**(For further development by the EWG)****1. General Guideline**

The name principle mentions only the description of the technique related to determining the test result (Annex A). The techniques used for sample preparation, extraction and separation were not included.

2. Definitions

For the purposes of alignment and harmonization regarding what is considered the principle of an analytical method, the following definition is proposed:

- **Principle** is the technique used for determining the provision, which may include critical information such as, for example, gravimetry - ashing at 550 °C.

To harmonize the descriptions of analytical techniques, the following definitions for main analytical techniques were considered:

- **Biological assay**: It is an analytical method to determine the response, potency or effect of a substance in vivo or in vitro.
- **Calculation**: when the determination is the result of a calculation based on test result(s). In this case, specify the provisions used.
- **Chromatography** is a method used to separate, identify and quantify a component of a mixture by distributing the components between two phases -- stationary phase and mobile phase.
- **Colorimetry**: It is a technique that involves only a colour reaction. The intensity of light (or filtered light) passing through the coloured sample is visually observed or measured and converted to a concentration based on a calibration curve.

Note: This should not be confused with the tristimulus colorimeter used to measure food colours.

- **Gravimetry**: It is a quantitative analytical method, that is, it determines the amount of a substance by measuring its weight (due to the action of gravity).
- **Potentiometry** is a method of electroanalytical chemistry. It is a quantitative analysis of ions in the solution using measured potentials in an electrochemical cell.
- **Sensory assay**: It is a technique that uses the senses for evaluation of the organoleptic attributes (appearance, odour, texture, taste and others) of a product.
- **Spectroscopy** is a technique which measures electromagnetic radiation for example: UV-Vis (Ultraviolet-Visible) spectrophotometry, infrared, atomic absorption, ICP (Inductively Coupled Plasma), nuclear magnetic resonance (NMR)
- **Mass spectrometry (MS)** is an analytical technique that is used to measure the mass-to-charge ratio of ions.
- **Titrimetry**: It is the determination of a given component from a solution by adding a liquid reagent of known concentration until a given result is achieved.
- **Visual examination**: It is a technique to detect the presence of defects, extraneous or foreign matter in a food through sight, with or without the support of optical equipment (example: magnifying glass, microscope or others).
- **Volumetry**: It is a technique that determines volume without the use of another determining technique, such as titration. In the case of tests where titration is used, it is not called volumetry.

3. Criteria Used**3.1 Assays Whose Results Are Method Dependent**

- A. Description in the principle of the factor that makes it dependent, if necessary, for example: temperature, conversion factor;
- B. Description only of the analytical technique used to obtain the "provision" result, since the other information is described in the methods. Therefore, the following may not be included, unless critical to the "provision" determination, for example: equipment, solvents or reagents used; and

- C. For tests that involve the development of microorganisms at a certain temperature, this temperature was included in the “provision” description.

Examples:

- *Moisture at 105 °C – Gravimetry*
- *Protein (Nx6.25) – Titrimetry and calculation*
- *Carbohydrates – Calculation based on the results of moisture, protein, fat, ash and dietary fibre*
- *Artificial dye (qualitative) – Colorimetric*
- *Drained net weight – Gravimetry*
- *Foreign Matter – Visual*
- *Fat – Gravimetry*

3.2 Assays Whose Results Are Independent of the Method

For instrumental tests, the technique used must refer to the main equipment used, for example: for separation, and the detector used for determination.

Examples:

- *Nitrate – UV-Vis (Ultraviolet-Visible) spectrophotometry*
- *Manganese – inductively coupled plasma optical emission spectrophotometry*
- *Potassium – potentiometry with selective electrode*
- *Mercury – atomic absorption spectrophotometry with cold vapor generator*
- *Aflatoxin M1 – high performance liquid chromatography with fluorescence detector*
- *Fatty acids - gas chromatography with flame ionization detector*

4. Additional Information

Considering the acceptance of the criteria described above, it is considered necessary to remove information such as: “ashing”, “ceramic filter filtration”, “complexometry”, “centrifugation”, “weighing”, “distillation”, “enzymatic”, “flotation”, “single sulfation”, “sieving” unless critical to the “provision” determination.

ANNEX A**PRINCIPLES OF METHODS OF ANALYSIS**

1. Anodic Stripping Voltammetry (ASV)
2. Atomic Absorption Spectrophotometry (AAS)
 - Cold Vapour (CV AAS)
 - Flame atomic absorption (FAAS)
 - Graphite furnace (GF AAS)
 - Hydride generation (HG AAS)
3. Biological assay
 - Bioassay (in animals, tissue, plants)
 - Microbioassay
4. Immunoassay
 - Enzyme Linked ImmunoSorbent Assay (ELISA)
5. Carbon Isotope Ratio Mass Spectrometry (Carbon IRMS)
6. Centrifugation
7. Colorimetry
8. Conductimetry/Resistivity
9. Confocal Laser Scanning Microscopy (CLSM)
10. Densitometry
11. Detect nuclear DNA Assay
 - DNA Comet Assay
 - Polymerase chain reaction (PCR):
 - PCR conventional (cPCR)
 - Real time qualitative (qPCR)
 - Reverse Transcriptase PCR (RT-PCR)
12. Electrophotometry
 - Electrometric
13. Enzymatic
14. Fluorimetry
15. Gas Chromatography (GC)
 - Electron Capture Detector (ECD)
 - Flame Ionization Detector (FID)
 - Flame Photometric Detector (FPD)
 - Flame Thermionic Detector (FTD)
 - Mass Spectrometry (MS)
 - Nitrogen Phosphorus Detector (NPD)
 - Tandem Mass Spectrometry (MS/MS)
 - Thermal Conductivity Detector (TCD)
 - Quadrupole Time-of-Flight (QTOF)
16. Gravimetry
 - Ashing at (temperature) °C
 - Drying at (temperature) °C
 - Rose-Gottlieb
 - Weibull-Berntrop
 - Schmid-Bondzynski- Ratslaff
 - Vacuum Drying at 70 °C
 - Microwave oven drying
17. Inductively Coupled Plasma (ICP)

- Isotope Dilution Mass Spectrometry (ID MS)
- Mass Spectrometry (MS)
- Optical Emission Spectrometry (OES)
- Quadrupole Inductively couple plasma mass spectrometry (Q-ICPMS)

18. Ion Exchange Chromatography (IC)

- Diode Array Detector (DAD)
- Electrochemical (EC)
- Mass Spectrometry (MS)
- Pulsed Amperometric Detector (PAD)
- Refractive index (RI)
- Conductivity Detector (CD)
- Ultraviolet-Visible (UV/Vis)
- Variable Wavelength Detector (VWD)

19. Liquid Chromatography (LC)

- Diode Array Detector (DAD)
- Fluorescence Detector (FLD)
- High-performance liquid chromatography (HPLC)
- High-Resolution Mass Spectrometry (HRMS)
- Infrared (IR)
- Isotope Dilution Mass Spectrometry (ID MS)
- Mass Spectrometry (MS)
- Matrix-Assisted Laser Desorption Ionization Time of Flight (MALDI-TOF)
- Pulsed amperometry detection (PAD)
- Refractive index (RI)
- Tandem Mass Spectrometry (MS/MS)
- Ultraviolet (UV)

20. Microscopy

- Electronic microscopy
- Optical microscopy

21. Nephelometry

22. Nuclear Magnetic Resonance Spectroscopy (NMR)

23. Photometry

24. Photostimulated Luminescence (PSL)

25. Polarimetry

26. Potentiometry

- Ion selective electrode (EIS)
- Potential of hydrogen pH electrode (pH)

27. Pycnometry

28. Refractometry

29. Spectrometry

- Electron Spin Resonance (ERS)
- Fluorescence (FLD)
- Fourier transform infrared Spectroscopy (FTIR)
- Infrared Spectroscopy (IRS)
- Near Infrared Reflectance Spectroscopy (NIRS)
- Raman (RS)
- Stable isotope mass (IMS)
- Ultraviolet (UV)
- Ultraviolet-Visible (UV-Vis)

30. Thermoluminescence

31. Thermometry

32. Thin Layer Chromatography (TLC)

- Densitometric detector
- Fluorescence (FLD)
- Ultraviolet-Visible (UV-Vis)

33. Titrimetry

- Acidity
- Iodimetry & Iodometry
- Karl Fischer
- Kjeldahl Digestion
- Lane & Enyon
- Wijs

34. Visual examination

35. Volumetry

ANNEX B**ACRONYMS AND ABBREVIATIONS OF PRINCIPLES OF METHODS OF ANALYSIS**

AAS	Atomic Absorption Spectrophotometry
AES	Atomic Emission Spectrometry
ASV	Anodic Stripping Voltammetry
Carbon IRMS	Carbon Isotope Ratio Mass Spectrometry
CD	Conductivity Detector
CE	Capillary Electrophoresis
CLSM	Confocal Laser Scanning Microscopy
cPCR	PCR conventional
CVAAS	Cold Vapour Atomic Absorption Spectrophotometry
DAD	Diode Array Detector
EC	Electrochemical Detector
ECD	Electron Capture Detector
EIS	Ion selective electrode
ELISA	Enzyme Linked ImmunoSorbent Assay
ESR	Electron Spin Resonance
FAAS	Flame Atomic Absorption Spectrophotometry
FIA- AAS	Flow injection Analysis Atomic Absorption Spectrophotometry
FID	Flame Ionization Detector
FLD	Fluorescence Detector
FPD	Flame Photometric Detector
FTD	Flame Thermionic Detector
FTIR	Fourier transform infrared spectroscopy
GC	Gas Chromatography
GFAAS	Graphite furnace Atomic Absorption Spectrophotometry
HGAAS	Hydride generation Atomic Absorption Spectrophotometry
HPLC	High Performance Liquid Chromatograph
HPTLC	High Performance Thin Layer Chromatography
HRMS	High-Resolution Mass Spectrometry
IC	Ion Chromatography
ICP	Inductively Coupled Plasma
ID	Isotope Dilution
IMS	Stable isotope mass
IR	Infrared
IRS	Infrared Spectroscopy
LC	Liquid Chromatograph
MALDI	Matrix-Assisted Laser Desorption Ionization
MS	Mass Spectrometry
MS/MS	Tandem Mass Spectrometry

NIRS	Near Infrared Reflectance Spectroscopy
NMR	Nuclear Magnetic Resonance Spectroscopy
NPD	Nitrogen Phosphorus Detector
OES	Optical Emission Spectrometry
PAD	Pulsed Amperometry Detection
PCR	Polymerase chain reaction
pH	pH electrode
PSL	Photostimulated Luminescence
qPCR	Real Time Qualitative
Q-ICPMS	Quadrupole Inductively couple plasma mass spectrometry
QTOF	Quadrupole Time-of-Flight
RI	Refractive Index
RS	Raman Spectroscopy
RT-PCR	Reverse Transcriptase PCR
TLC	Thin-layer chromatography
TOF	Time of Flight
UHPLC	Ultra-High Performance Liquid Chromatograph
UV	Ultraviolet
UV-Vis	Ultraviolet-Visible
VWD	Variable Wavelength Detector

ANNEX C**LIST OF ACRONYMS FOR STANDARD METHOD REFERENCES**

AACC	Cereals & Grains Association	(www.cerealsgrains.org/)
AIIBP	International Association of the Bouillon and Soup Industry	(www.culinaria-europe.eu/)
Anal. Chim. Acta.	Analytica Chimica Acta	(https://www.sciencedirect.com/journal/analytica-chimica-acta)
AOAC	AOAC International	(www.aoac.org/)
AOCS	American Oil Chemists' Society	(www.aocs.org/)
BS	British Standard	(www.bsigroup.com)
COI	Collection of methods by the International live	(www.internationaloliveoil.org/)
EN	European Standards	(www.en-standard.eu/)
EPA	Environmental Protection Agency	(www.epa.gov/)
EUsalt	European Salt Producers Association	(https://eusalt.com/)
FDA	Food and Drug Administration [Laboratory methods]	(www.fda.gov/)
ICC	International Association for Cereal Science and Technology	(https://icc.or.at/)
ICUMSA	International Commission for Uniform Methods of Sugar Analysis	(www.icumsa.org/)
IDF	International Dairy Federation	(https://fil-idf.org/)
IFU	International Fruit and Vegetable Juice Association [IFU Methods Analysis IFUMA]	(https://ifu-fruitjuice.com/)
IHC	International Honey Commission	(www.ihc-platform.net/)
ICA	International Office of Cocoa, Chocolate, and Sugar Confectionery	(www.icco.org/)
IS	Indian Standard	(www.bis.gov.in/)
ISI	International Starch Institute	(www.starch.dk/)
ISO	International Organization for Standardization	(www.iso.org/)
IUPAC	International Union of Pure and Applied Chemistry	(www.iupac.org/); (www.old.iupac.org/)
NMKL	Nordic-Baltic Committee on Food Analysis	(www.nmkl.org/)
OIV	International Organisation of Vine and Wine	(www.oiv.int/)
Ph. Eur	European Pharmacopoeia	(https://www.edqm.eu/en/the-european-pharmacopoeia)
USP	US Pharmacopeia	(www.usp.org/)
WEFTA	West European Fish Technologists Association	(www.wefta.org)