

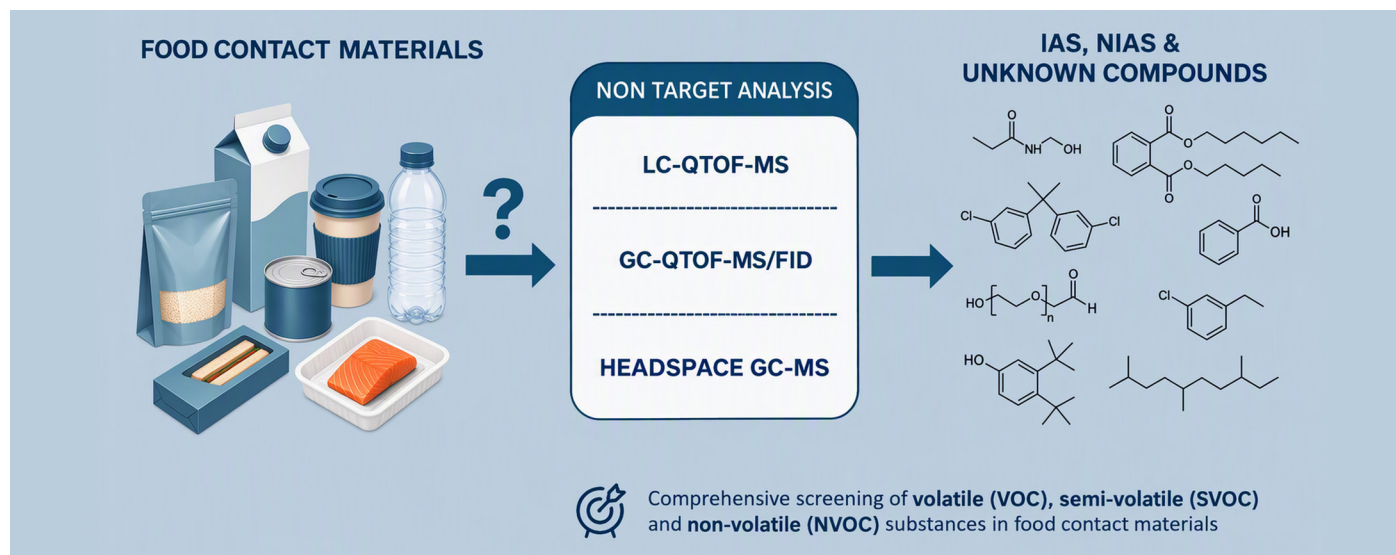
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Non-Intentionally Added Substances (NIAS) in Food Contact Materials

September 2026



What is non-target analysis?

Non-target analysis is an analytical approach designed to achieve the most comprehensive possible characterization of substances present in packaging and other food contact materials.

Unlike traditional target analysis, which focuses on a pre-defined list of known compounds, non-target analysis examines a sample without prior selection of analytes. The aim is to detect and identify as many extractable or migrating substances as possible.

To achieve this, high-resolution mass spectrometers are used to capture all measurable signals generated from a sample. By combining advanced data-processing software with extensive spectral databases, the detected signals can be assigned to potential chemical compounds.

Why is this important?

In addition to intentionally used substances, packaging materials may also contain unwanted by-products, known as NIAS (Non-Intentionally Added Substances).

These may include, for example:

- Reaction products, by-products and degradation products
- Oligomers
- Impurities from raw materials
- Residues from recycled materials
- Contaminations from production or storage

Since these substances are often not listed in formulations or declarations of compliance, they cannot be specifically

detected using target analyses. Their detection, identification and evaluation therefore represent a major challenge in the safety assessment of food contact materials.

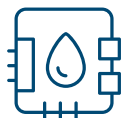
Our screening approach

To achieve the most comprehensive possible characterization of a sample, we combine a range of complementary analytical techniques:

Non-Volatile Organic Compounds (NVOC)	Semi-Volatile Organic Compounds (SVOC)	Volatile Organic Compounds (VOC)
High molecular weight	Medium molecular weight	Low molecular weight
Predominantly polar	Broad polarity range	Predominantly non-polar
Examples: photoinitiators, amines, acrylates, oligomers (e.g. polyester and PEG oligomers)	Examples: phthalates, siloxanes, hydrocarbons, polyester oligomers, natural products, antioxidants, fatty acids, fatty acid amides	Examples: solvents, monomers, odor-active compounds
LC-QTOF-MS	GC-QTOF-MS/FID	Headspace GC-MS

The combination of these techniques enables the detection of a wide range of potentially relevant substances. Depending on the substance class and sample matrix, detection limits in the low ppb range can be achieved.

Analyses can be carried out on both extracts and migration samples.



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Migration or extraction?

Migration: testing under realistic conditions

Migration testing simulates the actual use conditions of a food contact material. Expected storage and application conditions are reproduced using accelerated testing procedures. The material is brought into contact with an appropriate food simulant under regulatory-defined conditions. Our laboratories are equipped to perform all world-wide relevant migration testing conditions, ranging from one-sided migration tests and various time-temperature profiles to high-temperature applications under autoclave conditions.

Advantages:

- Realistic exposure estimation
- One-sided testing possible
- Food- and application-specific evaluation
- Direct relevance for compliance assessment

The selection of food simulants depends on the intended food contact application.

Extraction: comprehensive material characterization

During extraction, the material is typically cut into small pieces and extracted using a suitable solvent. This process releases a larger number of substances from the material than would normally migrate under intended use conditions. Extraction is therefore particularly suitable for comprehensive material characterization. As extraction is significantly more aggressive than migration testing, it does not represent a realistic use scenario and the results are not directly comparable to migration data.

Advantages:

- Comprehensive overview of the chemical composition
- Particularly suitable for the evaluation of raw materials and new material developments
- Increased probability of detecting NIAS and other unknown substances
- Batch-to-batch comparisons

To determine the actual content of a substance, a complete extraction procedure specifically tailored to both the material and the analyte must be applied.

Non-target vs target analysis

Target analysis	Non-target analysis
Screening for known substances	Screening for known and unknown substances
Quantitative determination	Semi-quantitative determination
Reference standards available	Identification using NIST and in-house databases
Suitable for compliance testing	NIAS identification and risk assessment
Confirmation of expected substances	Discovery of unexpected substances and contaminants

Target analysis enables the precise determination of known substances using available reference standards. Non-target analysis expands this approach by helping to reveal unknown, unexpected, or undeclared substances. Together, these complementary techniques provide the most comprehensive possible picture of a material's chemical composition and its potential migration profile.

Your benefits

- Identification and assessment of NIAS and unknown substances
- Early detection of impurities, degradation products, and process-related residues
- Comprehensive characterization of raw materials, packaging materials, and recycled materials
- Evaluation of material changes and support for root cause analysis
- Support for the development of new packaging solutions
- Assistance with regulatory requirements and compliance assessments

For any questions, please contact us at fcm@sqts.ch

Further reading

Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food

SR 817.023.21: Swiss Regulation on Food Contact Materials of 16.12.2016

EN 1186: Materials and articles in contact with foodstuffs - Plastics, May 2002, amended August 2022

EN 14338:2004-3: Paper and board intended to come into contact with foodstuffs - Conditions for determination of migration from paper and board using modified polyphenylene oxide (MPPPO) as a simulant, March 2004

ILSI Europe Report Series, Guidance on Best Practices on the Risk Assessment of Non Intentionally Added Substances (NIAS) in Food Contact Materials and Articles, 16/07/2015

BfR Guideline for risk assessment of non-intentionally added substances (NIAS) in the area of food contact materials, 10/09/2026