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Explore

Food contact materials

Identification and quantification workflows

ThermoFisher SCIENTIFIC

Food contact materials

A Food Contact Material (FCM) is any material approved for food use that comes in contact with food or drink products during manufacturing, packaging, preparation, and storage. They can be made from a variety of materials including plastics, rubber, paper, and metal. The safety of a FCM must be evaluated, as chemicals can migrate from the materials into the food. Food packaging must be manufactured in compliance with regulations, including good manufacturing practices, so that any potential transfer of chemical substances from the packaging to foods does not raise food safety concerns, change the composition of the food or have adverse effects on the taste or odor of the product.

Identify all suspects in food packaging

- A FCM must not transfer chemicals to, or cause changes to, foods above regulated migration limits that may impact consumer health.
- Testing is driven by regulation and demands migration studies that assess all known intentionally added substances (IAS) and 'unknown' non-intentionally added substances (NIAS).

Factors Affecting Migration

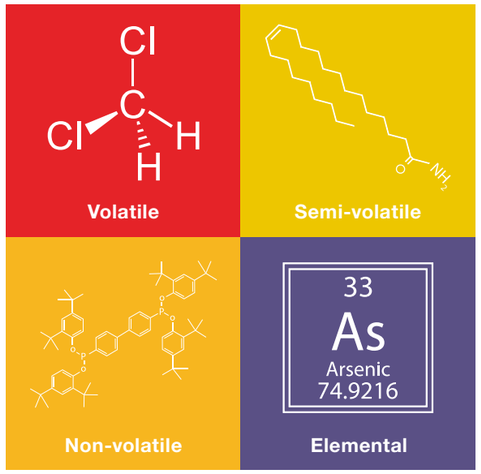
Heat
Higher temperatures increase migration.

Time
Long storage time increases migration potential.

Food type
Fatty/acidic foods & liquids have influence on migration.

Packaging size
Ratio of packaging surface to foodstuff volume.

Regulations
US FDA 21 CFR 174 to 21CFR 190.
EU Regulation 10/2011.



Confident Identification
The analysis of packaging impurities involves a diverse range of chemicals; from volatiles to high molecular weight non-volatile molecules and even metals.

and Quantification
These challenges require an arsenal of analytical techniques and workflows to meet the ever demanding challenges of compliance with global regulations.

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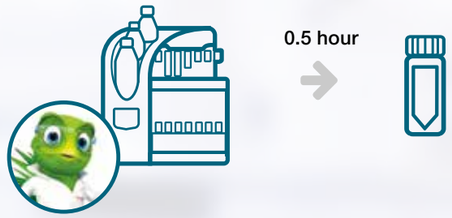
Extract smarter

Traditional Soxhlet or reflux techniques are labor intensive (>24 hours) and consume large quantities of solvent (>150 mL/sample).

Accelerated solvent extraction delivered by the Thermo Scientific™ Dionex™ ASE™ 350 System is an automated alternative with several advantages, including efficient extraction, reduced extraction time (<0.5 h/sample) and reduced solvent use (<30 mL/sample).

Conditions can be carefully controlled to ensure that the material is not deformed or damaged during the extraction process.

The ASE technique delivers comparable and more efficient extractions than the traditional Soxhlet methods; while saving time and solvent and delivering confidence through control by compliant Thermo Scientific™ Chromeleon Chromatography Data System Software.



www Click to learn more about the ASE 150/350 System

Quality columns you can rely on for accurate results

Hypersil GOLD HPLC columns

Thermo Scientific™ Hypersil GOLD™ HPLC columns are available in 12 different chemistries to optimize separations and maximize productivity. The extensive range of Hypersil GOLD columns offers chromatographers outstanding peak shape for reversed phase, ion exchange, HILIC or normal phase chromatography. With all 12 phases available with 1.9 µm particle size, Hypersil GOLD columns offer chromatographers flexibility in choosing the correct column, whether using conventional or ultra-high pressure LC systems.

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Accucore HPLC columns

Thermo Scientific™ Accucore™ HPLC columns provide a unique chromatography solution to enhance laboratory workflow and efficiency. Available in a wide range of stationary phase selectivities and compatible with almost any instrument, these columns provide an excellent return on investment.

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Accucore XL HPLC columns

Using 4 µm solid core particles, Accucore XL HPLC columns allow users of conventional HPLC methods to enjoy performance far beyond that of columns packed with 5 µm, 4 µm or even 3 µm fully porous particles.

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Gas chromatography columns

Columns that represent a leap forward in performance, delivering low bleed and superior inertness. Select from our comprehensive portfolio of Thermo Scientific™ GC columns that meet all of your analytical needs and achieve reliable, reproducible results for your gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS) applications.

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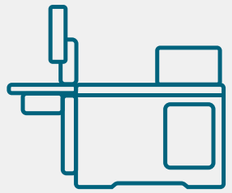
Volatiles

Low molecular weight, non-polar organic compounds are typically volatile and have the highest probability to migrate from or through polymeric packaging. Testing of the food contact material or packaging material is typically conducted by headspace sampling followed by gas chromatography and mass spectrometry.

No more volatile unknowns
In many food packaging testing laboratories, sample preparation often accounts for more than twice the time spent on actual chromatography. Improved sample handling can reduce turnaround times and significantly lower the cost per analysis. Automate and accelerate organic volatiles determinations, to increase sample turnaround and lower the cost per analysis, with the powerful **Thermo Scientific™ TriPlus™ 300 Headspace Autosampler.**

www Click to learn more about GC-MS Systems



Volatiles are released from materials using headspace sampling. Certain methods suggest the use of valve-and-loop headspace sampling systems. Ultraclean **Thermo Scientific™ Chromacol™** headspace vials ensure low background and leak free seals.

Modular GC allows your choice of injectors, together with helium saver options and the widest range of advanced column technologies, including **Thermo Scientific™ TraceGOLD™** GC column phases for volatiles.

Sensitive mass spectrometers delivers both quantitation and qualification of volatiles. **Thermo Scientific™ ISQ™ Series Quadrupole GC-MS** features a new source design ideal for continuous high-throughput operation.

Simple to operate and fully compliant **Thermo Scientific™ Chromeleon™ Chromatography Data System** (CDS) Software provides mass spectrometry data acquisition and processing.

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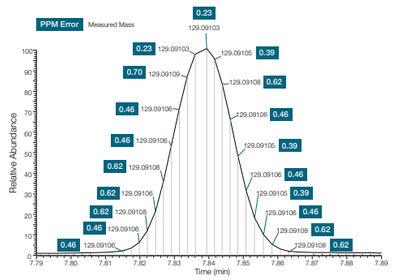
Semi-volatiles

Semi-volatile compounds are among the most frequently detected migration impurities. Testing is performed through liquid injection of an extract of the material or product. Often extracts are derivatized to increase analyte volatility. Testing demands absolute confidence in unknown identification and quantification.

Confident identification
Demand the 'Quanfirmation' power of Orbitrap high-resolution, accurate-mass (HRAM) mass spectrometry. Resolve interferences for the cleanest spectra; achieve exceptional mass accuracy for confident identification of unknowns; deliver accurate quantification at the lowest levels.

Orbitrap comes to GC-MS
The **Thermo Scientific™ Exactive™ GC Orbitrap™ GC-MS** system provides comprehensive characterization of samples in a single analysis for the highest confidence in compound discovery, identification, and quantitation. This system offers the quantitative power of a GC triple quadrupole MS combined with the high precision, full scan HRAM capabilities only available in combination with Thermo Scientific™ Orbitrap™ technology.



Exceptional <1ppm mass accuracy is achieved on every scan, on every mass, and at every concentration.

www Click to learn more about GC Orbitrap Systems

Ultra clean **Thermo Scientific™ MS Certified vials** ensure the lowest backgrounds to reduce false positives.

Simplify preparation with accurate, automated sample handling. Prepare standards, spike samples and automate derivatization with the **Thermo Scientific™ TriPlus™ RSH Autosampler**. With built-in robotics that deliver exceptional precision, flexibility, and reliable operation.

Absolute confidence in your analyte identification demands: HRAM GC-MS with <1ppm mass accuracy, femtogram sensitivity and 6 orders linear dynamic range.

Perform targeted screening, routine quantitation, and qualitative review of data with **Thermo Scientific™ TraceFinder™ Software**. Use advanced high resolution filtering (HRF) algorithms to provide a new dynamic in confident identification of unknowns.

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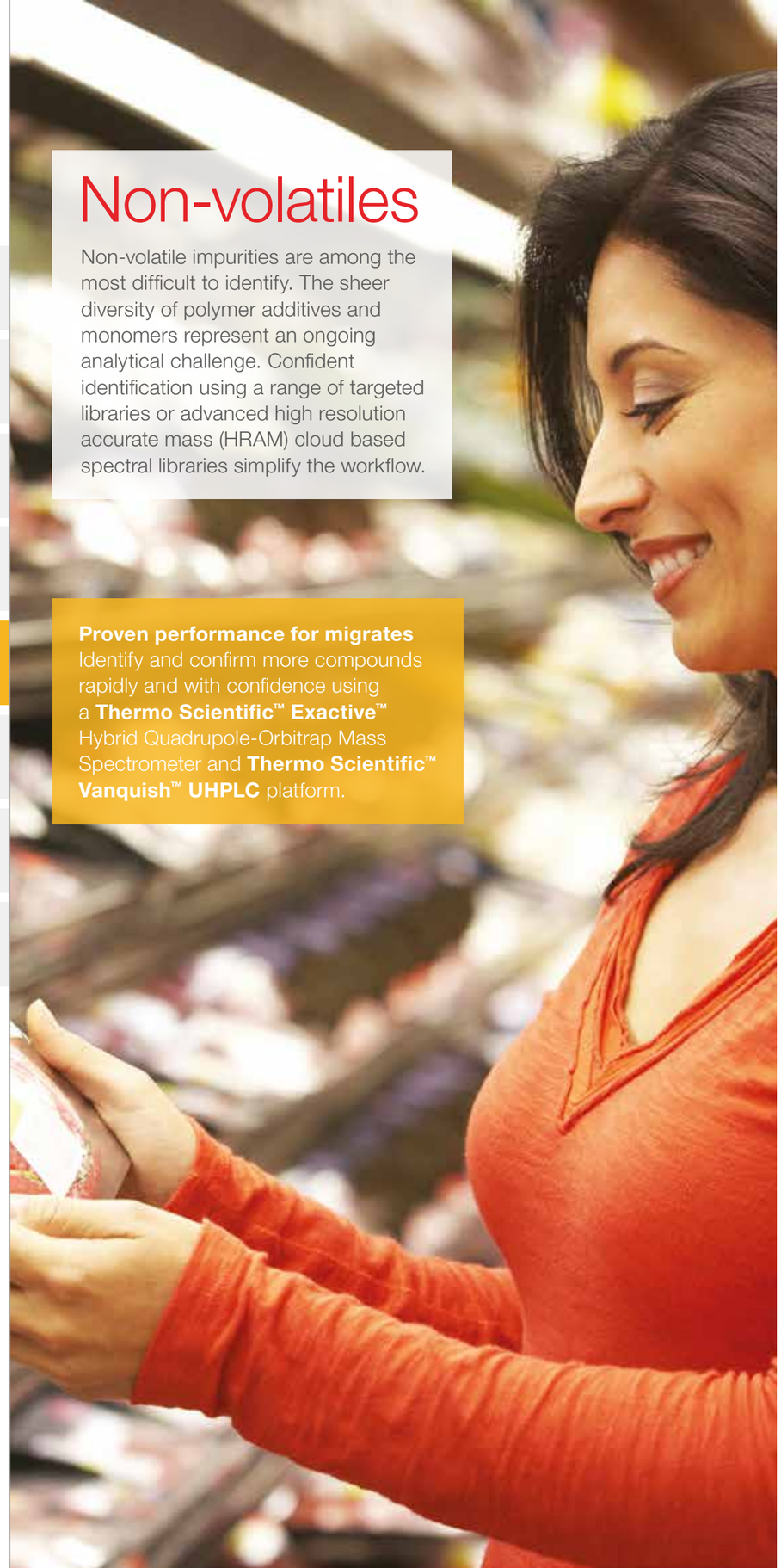

Non-volatiles

Non-volatile impurities are among the most difficult to identify. The sheer diversity of polymer additives and monomers represent an ongoing analytical challenge. Confident identification using a range of targeted libraries or advanced high resolution accurate mass (HRAM) cloud based spectral libraries simplify the workflow.

Proven performance for migrates
Identify and confirm more compounds rapidly and with confidence using a **Thermo Scientific™ Exactive™** Hybrid Quadrupole-Orbitrap Mass Spectrometer and **Thermo Scientific™ Vanquish™ UHPLC** platform.

Benchtop LC-Orbitrap MS/MS systems combine industry leading chromatography with quadruple precursor ion selection and high-resolution, accurate-mass (HRAM) Orbitrap detection to deliver exceptional performance and versatility.

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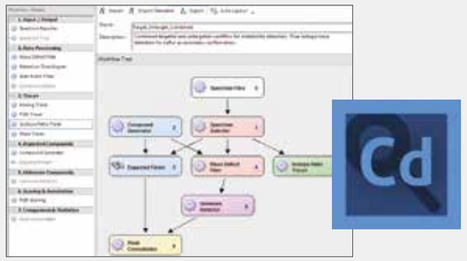
Robust chromatographic separations are delivered by **Thermo Scientific™ Vanquish™ UHPLC** platform with orthogonal detection techniques such as Charged Aerosol Detection providing universal coverage for unknowns, complementing MS detection and identification. Because CAD does not provide structural information.

Quick exchange ionization modes including APCI & ESI are complemented by fast polarity MS switching. Record both +/- scans within a single acquisition for complete ionization coverage. MS^n capabilities and exceptional mass accuracy, make the **Thermo Scientific™ Exactive™ Series** of mass spectrometers the perfect tools for structural elucidation of unknowns.

Thermo Scientific™ Compound Discoverer™ Software ensures confident compound identification and structural elucidation with advanced algorithms that quickly process and identify compounds based on multiple search approaches; including HRAM libraries, cloud based libraries like mzCloud, and compound databases. Searches are conducted in parallel and a single unified report is delivered.



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Elemental impurities

Elemental impurities are common in printed materials, pigments, foil based packaging and delivery systems.

Robust, compliant analysis at the lowest levels is provided by ICP-MS or ICP-OES.

Automate more
Your time is precious. Spend less time at the instrument by using automated, unattended system set-up routines like the advanced single-click ‘Get Ready’ function in **Thermo Scientific™ Qtegra™ Intelligent Scientific Data Solution™ (ISDS) Software**.

Simplicity, productivity, robustness
Gain complete confidence with accurate results. Enjoy minimal maintenance thanks to our intelligently engineered design. The **Thermo Scientific™ iCAP™ RQ ICP-MS** has the analytical performance to comfortably meet the most challenging food contact material and food packaging requirements for elemental impurities, including limits from the US FDA 21 CFR 174 to 21 CFR 190 Regulation and the EU 10/2011 Regulation.

www Click to learn more about Trace Elemental Analysis

Automation of the lab workflow has taken a step forward with integration of intelligent auto-dilution, eliminating manual intervention, increasing productivity.

The Thermo Scientific™ iCAP™ RQ ICP-MS delivers simplicity, productivity and robustness, combined with the flexibility for unattended 24/7 operation in routine, compliant environments.

Designed to comply with the most rigorous data audit and security measures, Qtegra ISDS Software is FDA 21 CFR Part 11 ready and comes with full IQ/OQ procedures for simple implementation in GMP/GLP regulated environments.

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Go from sample to results the fast and easy way

Whether you are performing routine product analysis, looking for potential migrates or carrying out food contact material or NIAS studies, the Thermo Scientific informatics and chromatography software solutions help you manage your entire laboratory process. Simplify your MS and MS/MS analyses with our mass spectrometry software platforms that feature intuitive and user-friendly interfaces that easily acquire, analyze, manage and report data generated by LC-MS, GC-MS and ICP-MS systems. Combine our software platforms with our extensive and searchable spectral libraries for easier quantification and Identification of your analytes.

Thermo Scientific™ SampleManager™

Provides comprehensive data and operations management and lab execution in a single solution. When integrated with Thermo Scientific™ Chromeleon™ CDS software you can benefit from a complete software platform that simplifies analysis and unlocks the value of your data.

Chromeleon™ 7.2 Chromatography Data System (CDS) Software

Streamline your entire chromatography workflow, giving you better results faster. Its advanced processing tools ensure quick, consistent results. Chromeleon is also the first CDS to unify workflows for chromatography and routine quantitative MS analysis. Chromeleon eWorkflows contain everything you need to perform a run including the sequence, instrument and processing methods and final reports simplifying the management and execution of routine analysis.

Thermo Scientific™ TraceFinder™ Software

Offer increased flexibility and an array of capabilities in performing targeted screening and routine quantitation with either high resolution accurate mass (HRAM) and/or triple stage quadrupole (TSQ) mass spectrometers with Thermo Scientific™ TraceFinder™ Software. Not only does TraceFinder provide method development tools for all molecule types, it also generates new methods from existing data.

www Click to learn more about Software Solutions

Thermo Scientific™ Compound Discoverer™

Ensure confident compound identification and structural elucidation with advanced algorithms that quickly process and identify changes between different sample groups and identify compounds based on multiple search approaches; including HRAM libraries, cloud based libraries like mzCloud™, and compound databases. Searches are conducted in parallel and a single unified report is delivered.

Thermo Scientific™ AppsLab Library of Analytical Applications

An online repository for methods created and tested by Thermo Fisher Scientific application chemists. These applications can be downloaded through one-click eWorkflows directly into Chromeleon CDS and are ready to run.

Qtegra™ Intelligent Scientific Data Solution™ Software

Minimize training, automate workflows, simplify your experience, and improve efficiency with the innovative Thermo Scientific™ Qtegra™ Intelligent Scientific Data Solution™ (ISDS) platform software. This shared software approach provides control and data processing for a range of elemental and isotopic analysis technologies including ICP-OES and ICP-MS. Designed for workflow, scalability, compliance and data management, Qtegra ISDS Software provides essential tools for consistent, accurate analysis. ChromControl™ and npQuant™ plug-ins to make applications for speciation and nanoparticles even easier.

Thermo Scientific™ AppsLab Library of Analytical Applications – One-click workflows for use with Chromeleon CDS.

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Find out more about our food contact material workflows **thermofisher.com/foodcontactmaterial**

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Stay Ahead! Scan the QR code or follow the URL to discover the latest in food contact material instrumentation.

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