

# Accurately Determine Mineral Oil Hydrocarbons in Food and Packaging



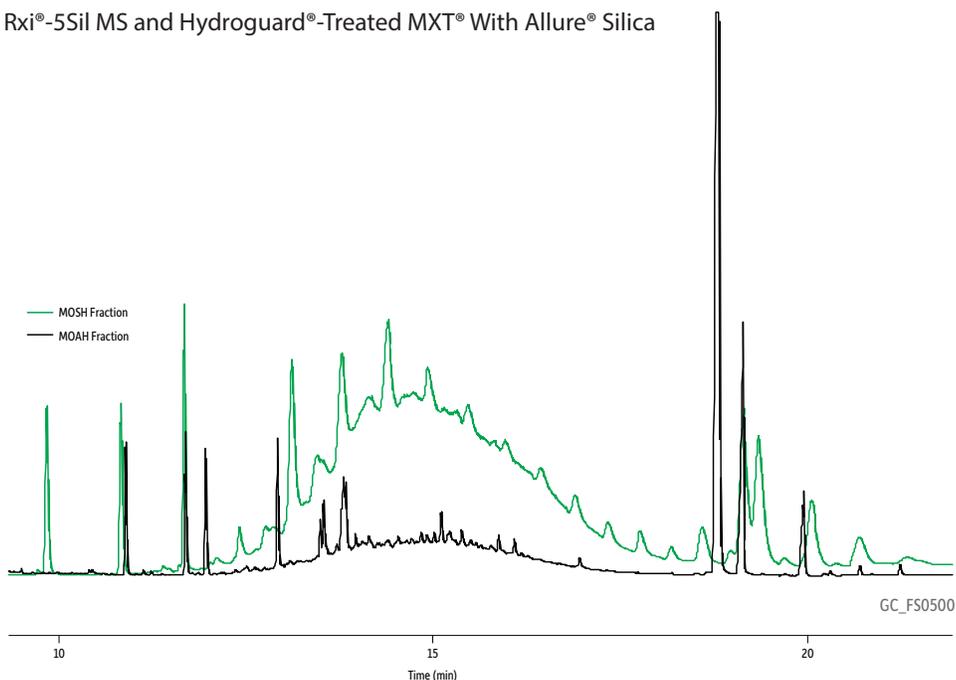
According to the German Federal Institute for Risk Assessment (BfR), mineral oil hydrocarbons (MOHs) may damage the liver, heart valves, and lymph nodes. Because the structure of some mineral oil hydrocarbons resembles that of PAHs, they may also be carcinogenic/mutagenic. These dangerous compounds can enter the food supply through farm and production equipment as well as through printer ink. In addition, current technology is unable to sufficiently remove MOHs from recycled cardboard. Once the cardboard is used for packaging, volatile hydrocarbons in mineral oils are then able to make their way into our food through gas diffusion.

In short, accurate testing for mineral oil hydrocarbons in food and packaging is imperative to the safety of our food supply; however, because MOHs include both aliphatic *and* aromatic hydrocarbons, analysis is difficult when employing standard methods. In response, a Swiss governmental lab, Kantonales Labor Zurich, devised a technique using LC fractionation coupled with GC-FID—and this technique has become the BfR reference method for the determination of MOHs in substances intended to come in contact with food. The R&D laboratory of Axel Semrau, a German solutions provider and equipment supplier, has been collaborating with DANI Instruments and leading food labs in Germany to drive the development of this methodology. With their input, Restek and its German subsidiary have created a unique solution for the analysis of mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH) in food and packaging (Figure 1).

Turn the page to find the answers to your **MOSH/MOAH** challenges!

**Figure 1:** MOSH/MOAH Compounds on Rxi®-5Sil MS and Hydroguard®-Treated MXT® With Allure® Silica HPLC Column (Online LC/GC Coupling)

**Column:** Rxi®-5Sil MS, 15 m, 0.25 mm ID, 0.25 µm (cat.# 13620) using Hydroguard®-Treated MXT® Guard Column & Transfer Line 10 m, 0.53 mm ID (cat.# 70084); **Sample:** 10 g rice extracted with 10 mL hexane, evaporated to a final volume of 0.5 mL; **Injection:** Direct; **Oven:** Oven Temp.: 60 °C (hold 8 min) to 85 °C at 5 °C/min (hold 2 min) to 325 °C at 25 °C/min (hold 6.4 min); **Carrier Gas:** He, constant pressure (29.01 psi, 200.0 kPa); **Detector:** FID; **Instrument:** DANI Master GC; **Notes:** **Sample Preparation:** The sample for this chromatogram was fractionated using HPLC under the following conditions: **Column:** Allure® Silica (cat.# 9160572); Dimensions: 250 mm x 2.1 mm ID; Particle Size: 5 µm; Pore Size: 60 Å; **Mobile Phase:** A: Hexane, B: Dichloromethane; **Gradient (%B):** 0.0 min (0% @ 0.3 mL/min), 1.5 min (35% @ 0.3 mL/min), 6.2 min (35% @ 0.3 mL/min), 6.3 min (100% @ 0.5 mL/min), 15.0 min (100% @ 0.5 mL/min), 15.1 min (0% @ 0.5 mL/min), 25.0 min (0% @ 0.5 mL/min), 25.1 min (0% @ 0.3 mL/min), 30.0 min (0% @ 0.3 mL/min); **Instrument:** Agilent 1260 Infinity; **Acknowledgement:** Restek thanks Axel Semrau GmbH & Co. KG with their collaborator, DANI Instruments S.p.A., for this chromatogram.



# World-Class Mineral Oil Hydrocarbon (MOH) Analysis by Restek



## Certified Reference Material (CRM):

### MOSH/MOAH Standard

This 9-component mix contains non-interfering internal standards as well as both MOSH and MOAH markers to correctly cut fractions for reliable results. Like all of the certified reference materials (CRMs) manufactured and QC-tested in Restek's ISO-accredited labs, it can also help you satisfy your ISO requirements with ease.

Compound (CAS #)	Conc.
Bicyclohexyl (92-51-3)	300 µg/mL
Cholestane (5- $\alpha$ -cholestane) (481-21-0)	600
1-Methylnaphthalene (90-12-0)	300
2-Methylnaphthalene (91-57-6)	300
<i>n</i> -Pentylbenzene (538-68-1)	300
Perylene (198-55-0)	600
1,3,5-Tri- <i>tert</i> -butylbenzene (1460-02-2)	300
<i>n</i> -Tridecane (C13) (629-50-5)	150
<i>n</i> -Undecane (C11) (1120-21-4)	300

150-600 µg/mL each in toluene, 1 mL/ampul cat.# 31070 (ea.)

## HPLC Column:

### Allure® Silica Column

This high-capacity 250 mm x 2.1 mm ID column is packed with ultra-pure 5 µm Allure® silica particles, which have small 60 Å pores and a surface area of 650 m<sup>2</sup>/g. The high purity and surface area facilitate MOSH/MOAH fractionation, while the robust chemistry and design boost column life.



Description		cat.#
5 µm Columns	250 mm, 2.1 mm ID	9160572

## GC Guard Column:

### Hydroguard®-Treated MXT® Guard Column

The extremely nonpolar nature of this water-resistant guard ensures efficient solvent trapping as well as complete and uniform wetting during injection from the HPLC system, minimizing peak splitting and maximizing MOH resolution. Additionally, the MXT® tubing adds amazing ruggedness, so your guard lasts longer under even harsh conditions.



Nominal ID	Nominal OD	10-Meter cat.#
0.53 mm	0.74 ± 0.025 mm	70084

Diameters greater than 0.10 mm are tested with the Grob test mix to ensure high inertness.

## GC Analytical Column:

### Rxi®-5Sil MS Column

Restek's elite line of Rxi® gas chromatography columns is manufactured and tested to offer industry-leading performance and reproducibility. The low-polarity Rxi®-5Sil MS stationary phase incorporates phenyl groups in the polymer backbone to increase stability and reduce bleed, making it ideal for use in demanding analyses like the determination of mineral oil hydrocarbons.



ID	df	temp. limits	15-Meter cat.#
0.25 mm	0.25 µm	-60 to 320/350 °C	13620

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