

Application Note no. 123

Thermal Desorption Analysis of MOSH/MOAH in Paper using OPTIC-4 Inlet with LINEX and Capping-De-Capping Station

Key words: OPTIC, LINEX, Capping-De-Capping Station, MOSH, MOAH, PAL3

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Introduction

Mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH) are known to cause health risks if ingested. Food manufacturers as well as analytical laboratories are faced with challenges when trying to find the sources and points of these compounds. Potential sources also include different sorts of food packaging materials, especially those produced from the recycled paper. In this application we focus on the analysis of MOSH/MOAH in paper using direct thermal desorption technique.

Samples

A piece (approx. 5 x 2 cm²) of recycled paper contaminated with MOSH or MOAH compounds placed directly into inlet liner (Fig. 1a). To protect the sample from further contamination, the liner is capped with PTFE caps and placed in a LINEX tray on sample rack a PAL3 auto-sampler (Fig. 1b).

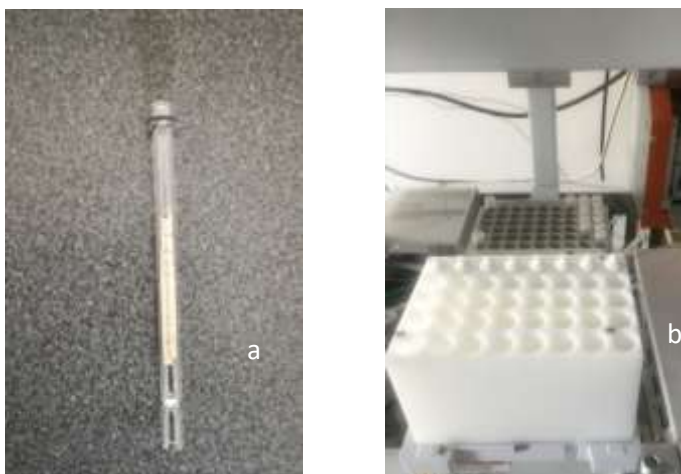


Figure 1

The analysis sequence is performed using the following instrumentation and conditions:

YouTube movie example at <https://youtu.be/gVPltwpMQzo> shows the sequence.

Instrumentation:

GC Inlet: OPTIC-4 Multimode Inlet
 Liner: 2414-1003, single-necked liner
 GC-MS: Shimadzu QP2010
 GC column: GL Sciences InertCap 5MS/Sil, 0.25 m x 30 m, film 0.25 µm

Conditions:

OPTIC-4

Method Type	Expert
Equilibration Time	00:05 min:sec
End Time	30:00 min:sec
Initial Temperature	40 °C
Ramp Rate 1	10.0 °C/s
Hold Temperature 1	175 °C
Solvent Cooling Effect	No
Cooling Valve Mode	No
Septum Purge Flow	5 mL/min
Vent Mode	Fixed Time
Vent Time	00:30 min:sec
Carrier Control Mode	Flow Control
Zero LINEX Head Pressure	No
Initial Column Flow	1.0 mL/min
Start Column Flow 1	1.0 mL/min
End Column Flow 1	1.0 mL/min
Column Flow/Inlet Pressure Time 1	01:00 min:sec
Start Column Flow 2	1.0 mL/min
End Column Flow 2	1.0 mL/min
Direct Split Valve Control	No
Initial Split Flow	50.0 mL/min
Split Flow 1	0.0 mL/min
Split Flow Time 1	01:00 min:sec
Split Flow 2	50.0 mL/min

QP2010 GC/MS:

GC:

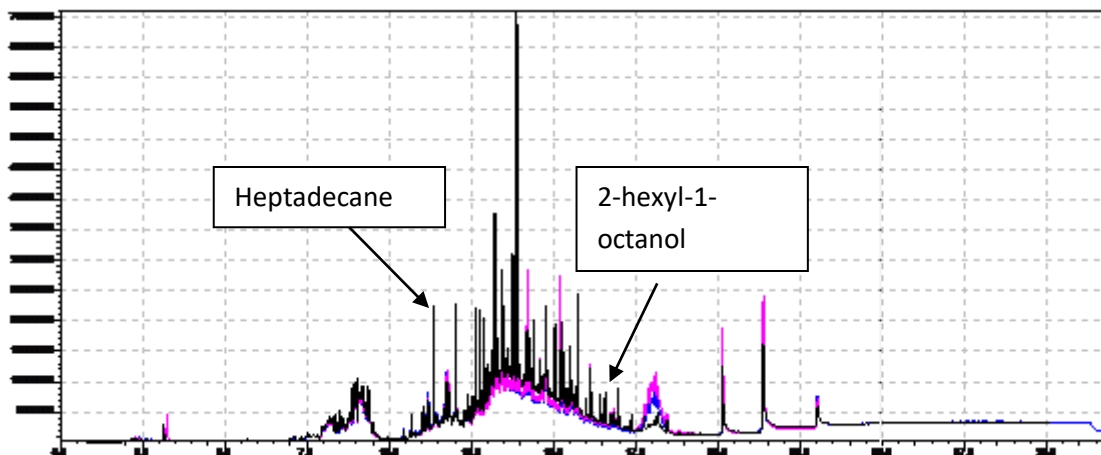
Ramp rate (°C/min)	Temperature (°C)	Hold time (min)
	40.0	4
20.0	325	15

MS:

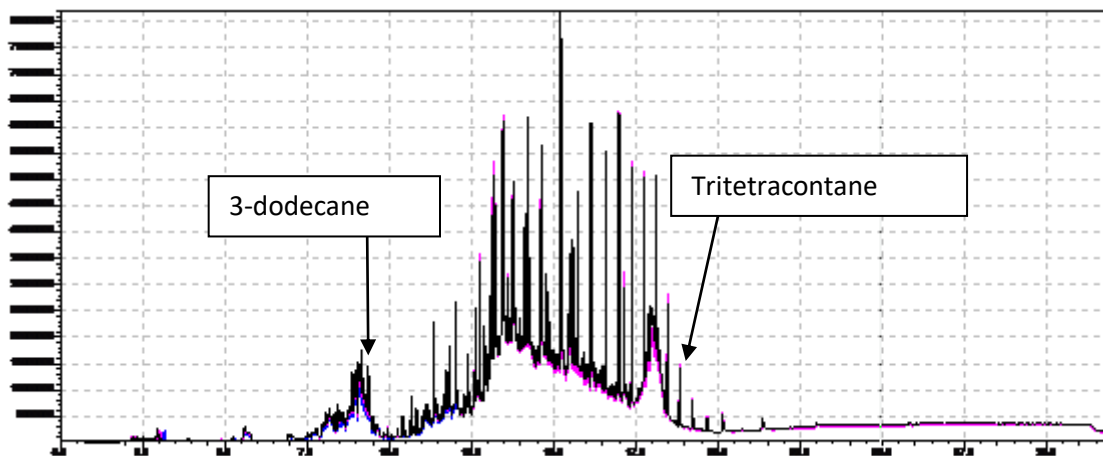
Ion Source Temperature (°C)	200 °C
Transfer line Temperature (°C)	250 °C
Detector Voltage:	Use tune file
Solvent Cut Time: (min)	0
Micro Scan Width	0
Threshold	0
Start time: (min)	0.0
End time: (min)	32.0
Acquisition mode:	Scan
Event time (sec)	0.1
Scan speed	1000
Start m/z	50
End m/z	1000

Results:

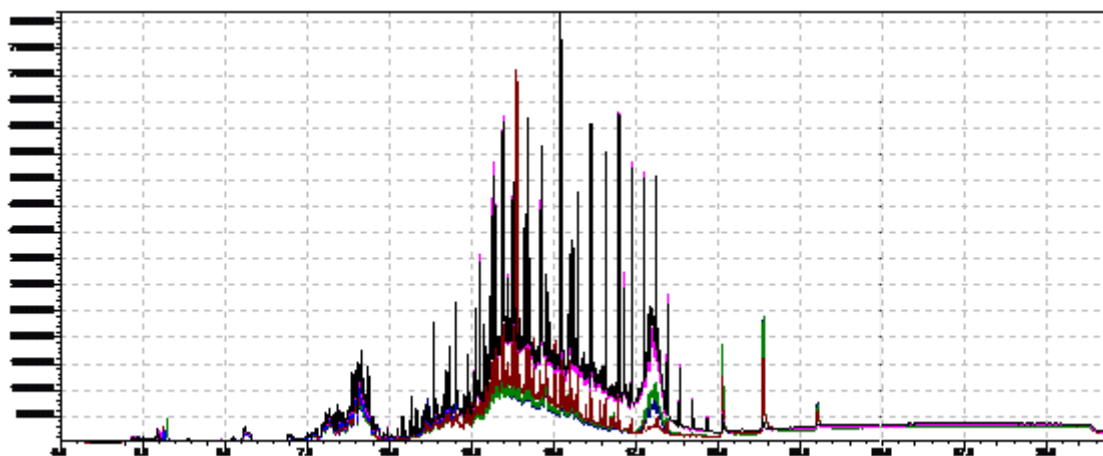
Sample 1: Piece of paper 1



Sample 2: Piece of paper 2



Overlapping comparison:



Conclusion:

For the automation of the MOSH-MOAH analysis in paper, the PAL3, OPTIC and LINEX are very capable of running many samples a day. The sample preparation is very simple; a piece of paper with the size 5 x 2 cm² is cut and placed directly into the inlet liner.