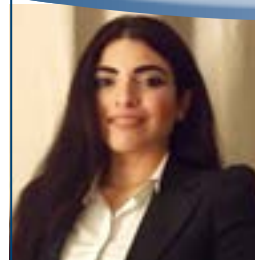


APPLICATIONS

Improving the Analysis of European Union (EU) PAHs using a Zebron™ ZB-PAH GC Column

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Rola has a Masters degree in Chemistry. She enjoys reading and traveling. She believes dreams are future facts, only with some discipline.

Overview

Polycyclic aromatic hydrocarbons (PAHs) are chemical compounds that can result from combustion processes of organic substances or from heat processing of food. Some of them are of particular concern for human health.

Human beings are exposed to PAHs via air and drinking water, but mostly by intake of food. Food contamination with PAHs largely arises from production practices, although environmental contamination is also an issue, since they are formed during incomplete combustion processes. Grains and raw products for the production of edible oil (e.g. olives) may be contaminated with PAHs through drying processes whereas food from animal origin is mainly contaminated through processing (e.g. charcoal grilling, roasting, and smoking).¹

PAHs are carcinogenic. Therefore, the EU has set maximum levels of PAHs in foodstuffs via Regulation (EC) No 1881/2006 amended by Regulation (EU) No 835/2011, which added limits for the sum of four PAHs in foodstuffs including adding smoked sprats and canned smoked sprats to the range of foodstuffs.

The European Commission recommended the monitoring of fifteen EU priority PAHs along with an additional PAH highlighted by the joint FAO/WHO Expert Committee on Food Additives (JECFA).²

Introduction

This technical note includes the analysis of the 15+1 EU PAHs using a Zebron ZB-PAH 20 m x 0.18 mm x 0.18 μm GC column (**Figure 1**) and a comparative evaluation of Restek's Rxi[®]-17 column (**Figure 2**).

Materials and Methods

Column A: Zebron ZB-PAH
Dimension: 20 meter x 0.18 mm x 0.14 μm
Part No.: 7FD-G038-47

Column B: Restek Rxi-17
Dimension: 20 meter x 0.18 mm x 0.14 μm
Part No.: 13502

Injection: Splitless @ 325 °C, 0.5 μL

Recommended Liner: Zebron PLUS Single Taper with Wool

Liner Part Number: AG2-0A11-05 (for Agilent® systems)

Carrier Gas: Helium @ 1 mL/min (constant flow)

Oven Program: 45 °C for 0.8 min to 200 °C @ 45 °C/min to 225 °C @ 2.5 °C/min to 266 °C @ 3 °C/min to 300 °C @ 5 °C/min to 320 °C @ 10 °C/min for 4.5 min

Detector: MS @ 300 °C; 50-550 amu

Scan range: 50-550 AMU

Transfer Line: 330 °C

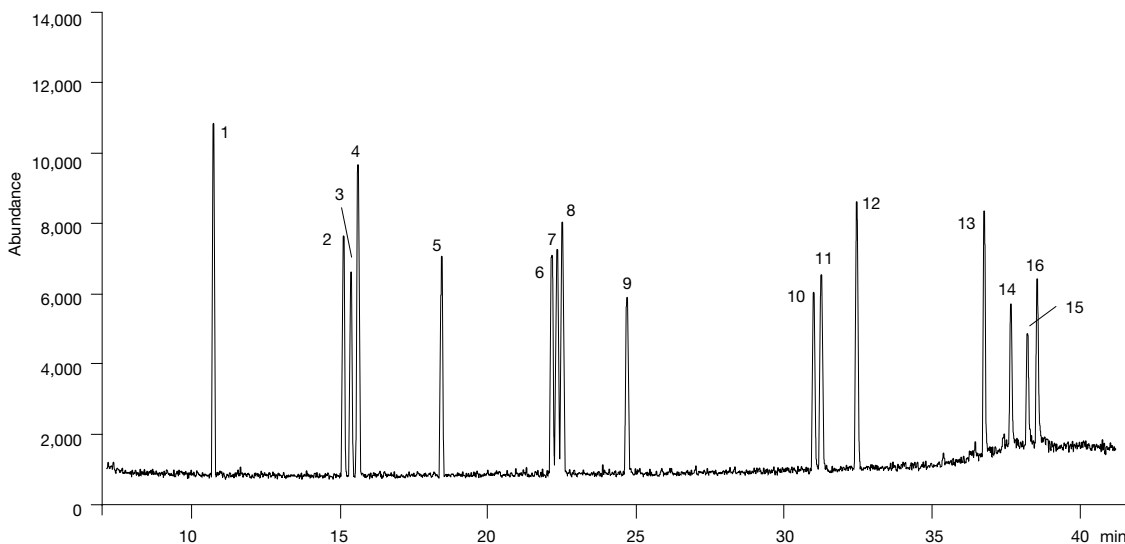
MS Source: 300 °C

MS Quad: 180 °C

Sample:

1. Benzo[c]fluorene	9. Benzo[a]pyrene
2. Benz[a]anthracene	10. Indeno[1,2,3-cd]pyrene
3. Cyclopenta[c,d]pyrene	11. Dibenzo[a,h]anthracene
4. Chrysene	12. Benzo[g,h,i]perylene
5. 5-Methylchrysene	13. Dibenzo[a,i]pyrene
6. Benzo[b]fluoranthene	14. Dibenzo[a,e]pyrene
7. Benzo[k]fluoranthene	15. Dibenzo[a,i]pyrene
8. Benzo[j]fluoranthene	16. Dibenzo[a,h]pyrene

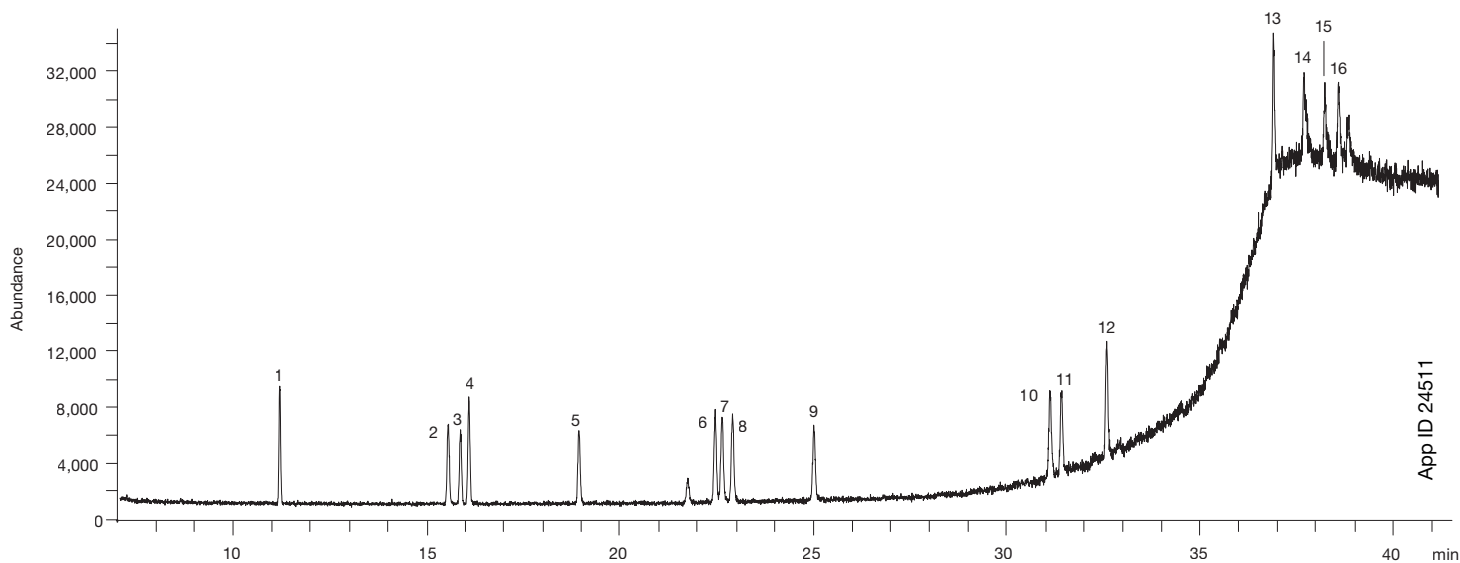
Figure 1.
Analysis of 15+1 EU PAH standards using Zebron ZB-PAH



App ID 24510



Figure 2.
Analysis of 15+1 EU PAH standards using Restek Rxi®-17



Conclusions

Zebtron™ ZB-PAH effectively separates the 15+1 EU regulated PAH isomers, resolving all critical and difficult to separate pairs along with great peak shape.

The comparison of ZB-PAH and Restek Rxi-17 shows that ZB-PAH exhibits lower bleed. The excess bleed on the Restek Rxi-17 column at high temperature can result in challenging and difficult quantitation of four dibenzopyrene isomers (**Figure 2**).

The ZB-PAH column also offers improved peak shape which makes it a great choice for the analysis of the EU regulated PAHs.

References

The European Commission's science and knowledge service, website

European Union , Commission Recommendation 2005/108/EC, Off. J. EUR. Comm. L34 (2005) 43



Comparative separations may not be representative of all applications. Phenomenex is in no way affiliated with Restek Corp.

Ordering Information

Zebtron™ GC Columns

Phase	ID (mm)	df (µm)	Length (m)	Part No.
ZB-PAH	0.18	0.14	20	7FD-G038-47
ZB-PAH	0.25	0.25	30	7HG-G038-11
ZB-PAH	0.25	0.25	60	7KG-G038-11

Zebtron PLUS GC Inlet Liners

	Description	Application	Dimensions ID x L (mm)	Unit	Part No.
For Agilent® or Thermo Scientific® GC Systems					
	Single Taper Z-Liner™	Semi-volatiles, dirty samples	4 x 78.5	5/pk	AG2-0A13-05
				25/pk	AG2-0A13-25
	Single Taper with Wool	Semi-volatiles	4 x 78.5	5/pk	AG2-0A11-05
				25/pk	AG2-0A11-25



If Phenomenex products in this technical note do not provide at least equivalent separation as compared to other products of the same phase and dimensions, return the product with comparative data within 45 days for a FULL REFUND.



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