

LC-MS Analysis of PAHs in Grilled Meat

Ascentis[®] Express PAH

Polycyclic aromatic hydrocarbons (PAHs) are organic compounds that consist of multiple rings containing only carbon and hydrogen. These compounds are produced naturally (e.g. petroleum seeps, forest fires, volcanoes) or anthropogenically by incomplete combustion or high-pressure processes. A dominant source of PAHs are from human activity: wood-burning and combustion of other biofuels such as dung or crop residues contribute more than half of annual global PAH emission. Grilling meats can also form PAHs.

PAHs are ubiquitous and human exposure can cause irritation, mutation, and cancer. Due to the negative health effects, government agencies have established methods for detection and reporting. PAHs are often screened in panels of 18 compounds or more by environmental laboratories using regulated HPLC methods.

The LC-MS Analysis of extracted grilled meat shows a PAH contamination of chrysene and benzo[a]pyrene. Both PAH are considered probable or possible human carcinogens by the US EPA, the European Union, and/or the International Agency for Research on Cancer (IARC).

LC Conditions:

Column	Ascentis [®] Express PAH, 2.7 µm, 10 cm x 2.1 mm, 90 Å; [53532-U]
Mobile Phase	A: Water/0.1% formic acid B: Acetonitrile/0.1% formic acid
Flow Rate	0.4 mL/min
Pressure	289 bar
Column Temperature	30 °C
Injection Volume	1 µL
Sample Solvent	Methanol
LC System	Shimadzu Nexera

Gradient

Time	%B
0.0	40
5.0	100
8.0	100
8.01	40

MS Conditions:

ESI voltage	5.5 kV
Heater Temp	400 °C
Sheath gas	35 (arbitrary units)
Aux gas	8 (arbitrary units)
Tube lens voltage	40 V

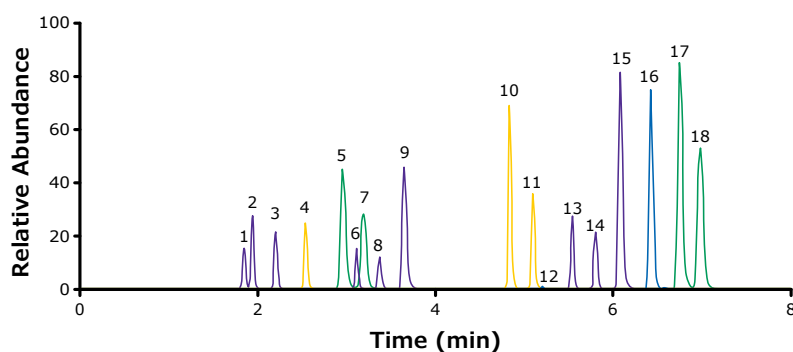


Figure 1: Extracted ion chromatogram of PAH standard compounds

Peak Identities

1. Naphthalene
2. Acenaphthylene
3. 1-methylnaphthalene
4. 2-methylnaphthalene
5. Acenaphthene
6. Fluorene
7. Phenanthrene
8. Anthracene
9. Fluoranthene
10. Pyrene
11. Benzo[a]anthracene
12. Chrysene
13. Benzo[b]fluoranthene
14. Benzo[k]fluoranthene
15. Benzo[a]pyrene
16. Dibenzo[a,h]anthracene
17. Benzo[g,h,i]perylene
18. Indeno[1,2,3-c,d]pyrene

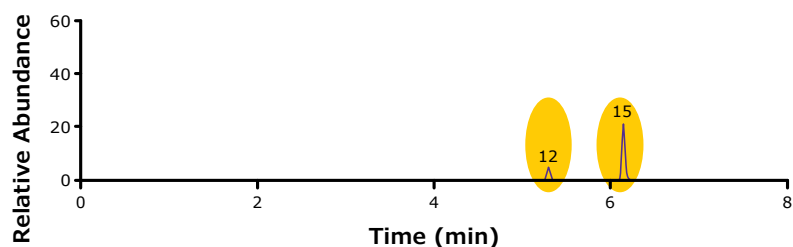


Figure 2: Extracted ion chromatogram of the extracted steak sample showing PAH contamination of chrysene and benzo[a]pyrene

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