

TWO METHODS FOR QUICK ANALYSIS OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) USING THE AXCEND FOCUS LC[®]

OVERVIEW

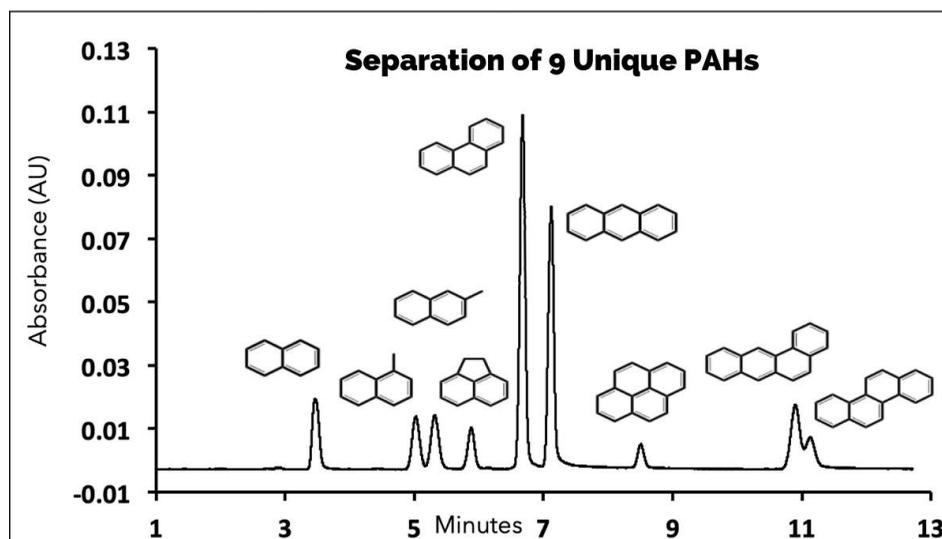
The Axcend Focus LC[®] was used to separate polycyclic aromatic hydrocarbons (PAHs) in ~12 and ~15 minutes, respectively, with separate methods on short (10 cm x 150 μ m i.d.) capillary columns packed with 1.7 μ m monomeric and 3.0 μ m diameter polymeric C18 particles.

As a lightweight, hand-portable, AC- or DC-powered high-performance liquid chromatography system that utilizes capillary columns and on-column UV-absorption detection, the Axcend Focus LC is uniquely suited for both in-the-field or laboratory-based HPLC detection, separation and analysis of a variety of target chemicals, including products and by-products of fossil fuels, pollutants, and agrichemicals, to name a few.

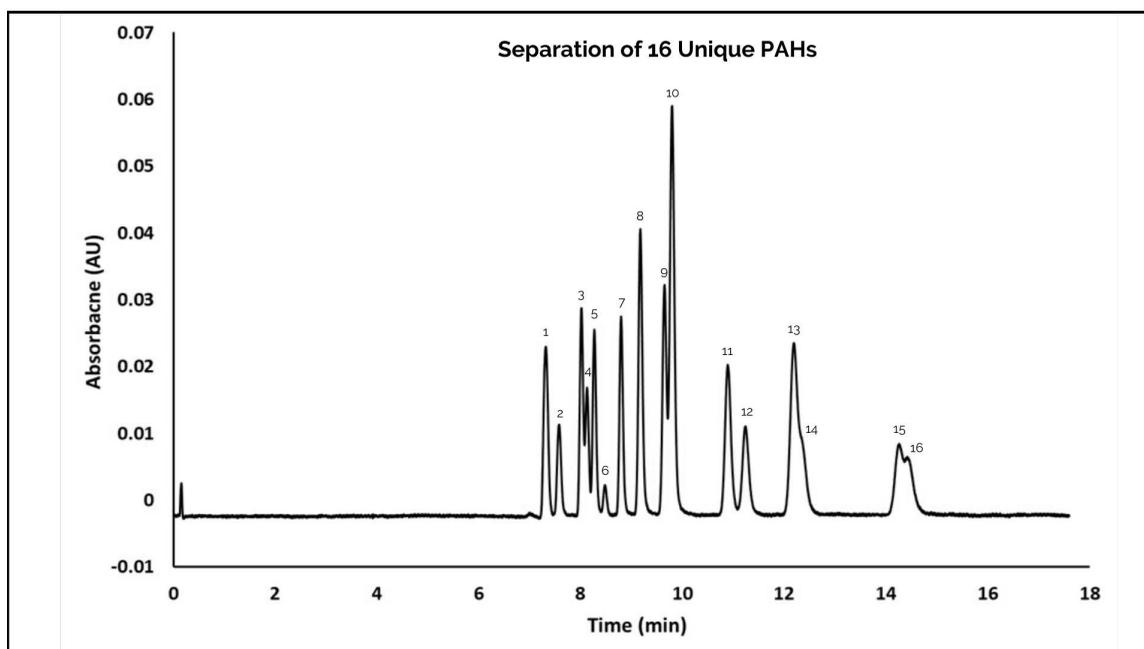
INTRODUCTION

PAHs are ubiquitous environment pollutants typically formed by incomplete combustion of organic matter by nature or humans. As primary pollutants (including many that are carcinogenic), PAHs are regularly monitored by corporate, government, and non-government (NGOs) alike. Because PAHs strongly absorb UV light and many PAHs are also isomers (compounds with identical chemical formulas but different structures), UV-based HPLC is highly effective for separating, detecting, and analyzing PAHs.

This brief application note highlights the separation, detection and analysis of 9 and 16 PAHs via 10 cm x 150 μ m i.d. capillary columns packed, respectively, with 1.7 μ m and 3.0 μ m diameter 100 Å pore size particles.



Separation and UV-absorption detection of 9 (nine) PAHs of interest at 255 nm using the Axcend Focus LC. Elution Order: naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, phenanthrene, anthracene, pyrene, benz[a]anthracene and chrysene (only slightly resolved). Flow Rate: 3.5 μ L/min; Gradient: 40% to 60% B; Equilibration Time: 2 min; Mobile Phase A: Water (H₂O); Mobile Phase B: Acetonitrile (ACN); Column: 10 cm x 150 μ m i.d.; Particle Diameter: 1.7 μ m of 100 Å monomeric C18.



Separation and UV-absorption detection of 16 PAHs of interest at 255 nm using the Axcend Focus LC. Elution Order: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benz[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, dibenz[a,h]anthracene, benzo[ghi]perylene, and indeno[1,2,3-cd]pyrene. Flow Rate: 0.64 $\mu\text{L}/\text{min}$; Gradient: 55% to 100% B; Equilibration Time: 5 min; Mobile Phase A: water (H_2O); Mobile Phase B: acetonitrile (ACN); Column: 10 cm x 150 μm i.d.; Particle Diameter: 3.0 μm of 100 \AA polymeric C18.

SUMMARY

We separated and detected mixtures of 9 and 16 standard PAHs in ~12 and ~15 minutes, respectively, using the hand-portable Axcend Focus LC with on-column UV-absorption detection. For the method targeting 9 PAHs, we utilized a short 10 cm x 150 μm i.d. capillary column packed with 1.7 μm d_p 100 \AA monomeric C18. To demonstrate improved resolution of more complex mixtures, *i.e.*, 16 PAHs, we switched to 3.0 μm d_p 100 \AA polymeric C18.

Because of its relatively low cost, minimal solvent consumption, and minimal waste production, the Axcend Focus LC offers a significant reduction in the Total Cost of Ownership (TCO) for organizations that use HPLCs to separate and analyze samples to detect the presence and concentrations of PAHs. An added bonus is that this approach clearly qualifies as "green" analytical chemistry.

Axcend[®]

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