SHIMADZU

Nexera
Ultra High Performance Liquid Chromatograph

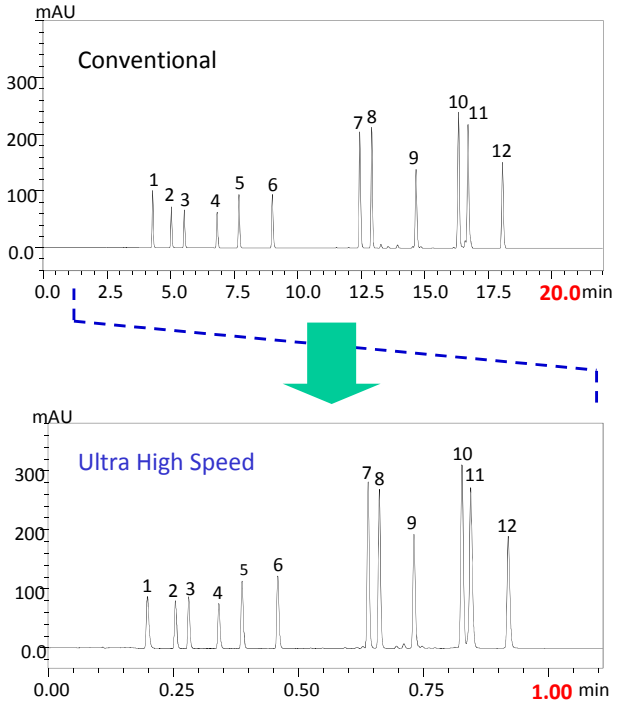
Nexera Application Data Sheet No.14

Ultrafast Analysis of Synthetic Colorants

Various types of synthetic colorants are used as food additives, and gradient elution is generally used to analyze them. Nexera enables stable, ultrafast gradient elution through accurate solution delivery and the use of a high-efficiency gradient mixer. This document introduces an example of ultrafast analysis performed on 12 tar synthetic colorants using Nexera and a Phenomenex Kinetex C18 column (particle size 2.6 µm, a core-shell column where a 0.35 µm porous membrane is combined with a 1.9 µm solid core).

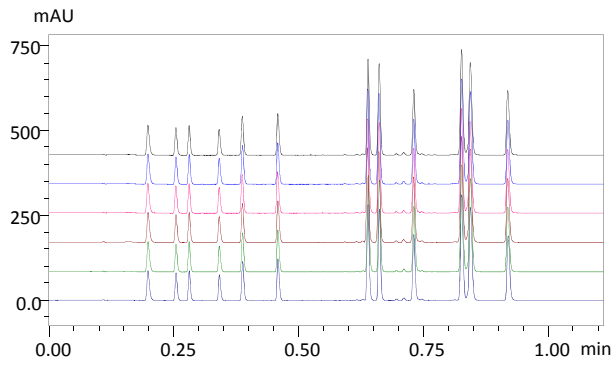
Batch analysis of 12 synthetic colorants

Analysis time was shortened to 1/20 of conventional analysis for standard mixtures (50 mg/L each) by using the Phenomenex Kinetex C18 column, which provides a higher linear flow rate. Good repeatability of retention time and peak area was also achieved.



Column	: Shim-pack VP-ODS (150 mmL. x 4.6 mmI.D., 4.6 µm)
Mobile phase	: A: 10 mmol/L Ammonium acetate B: Mobile phase A/Acetonitrile=1/1
Gradient	: B 5 % (0 min)→100 % (20-30 min)
Flow rate	: 1.0 mL/min (Mixer 180 µL)
Column temp.	: 40 ℃
Injection volume	: 2 µL
Detection	: UV-VIS (SPD-M20A) Max Plot 400-700 nm
Flow cell	: Conventional cell
Pressure	: 8 MPa

Column	: Phenomenex Kinetex 2.6 µm C18 100 Å (50 mmL. x 3.0 mmI.D., 2.6 µm)
Mobile phase	: A: 10 mmol/L Ammonium acetate B: Mobile phase A/Acetonitrile=1/1
Gradient	: B 5 % (0 min)→100 % (1.1-1.6 min)
Flow rate	: 2.5 mL/min (Mixer 20 µL)
Column temp.	: 40 ℃
Injection volume	: 1 µL
Detection	: UV-VIS (SPD-M20A) Max Plot 400-700 nm
Flow cell	: Semi-micro cell
Pressure	: 53 MPa



Repeatability of Retention Time and Peak Area

Peak No.	Retention Time %RSD	Peak Area %RSD
1	0.103	0.117
2	0.069	0.161
3	0.047	0.289
4	0.068	0.219
5	0.091	0.116
6	0.057	0.203
7	0.066	0.170
8	0.056	0.206
9	0.021	0.073
10	0.034	0.117
11	0.032	0.140
12	0.037	0.148

(n=6)

Peaks:
1. Tartrazine, 2. Amaranth, 3. Indigo Carmine, 4. New Coccine, 5. Sunset Yellow FCF, 6. Allura Red AC,
7. Fast Green FCF, 8. Brilliant Blue FCF, 9. Erythrosine, 10. Acid Red, 11. Phloxine, 12. Rose Bengale

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