



High Speed Analysis of Food Coloring Powdered Juice using UHPLC

Introduction

Food coloring compounds, both chemically synthesized and natural, are used to produce a desired color in a particular food. Among those food coloring compounds, some are approved for use as a food additive in certain quantities, while others are being evaluated for their affect on the consumer's health.

As food coloring are just that, colors, they absorb light at very different wavelengths, thus a photodiode array is employed for this UHPLC analysis in powdered juice.



X-LC 3185PU

Keywords: : UHPLC, Powder juice, Food Colorings , 2.0 μm , C18 Column, PDA detector, Tartrazine (Y4), Amaranth (R2), Indigotine (B2), Sunset Yellow FCF (Y5), Allura Red AC (R40), Fast Green FCF (G3), Brilliant Blue FCF (B1), Erythrosine (R3), Acid Red (R106)

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Experimental

Equipment

Pump:	X-LC 3185PU x2
Degasser:	X-LC 3080DG
Mixer:	X-LC 3180MX
Column Oven:	X-LC 3067CO
Autosampler:	X-LC 3195AS
Detector:	X-LC 3110MD

Conditions

Column:	X-PressPak V-C18 (2.0 mm I.D. x 50 mmL, 2.0 μ m)
Eluent A:	0.01M Ammonium acetate/ Acetonitrile (95/5)
Eluent B:	Acetonitrile
Gradient Condition:	(A/B), 0 min (100/0) 1.0 min (50/50) 2.0 min (50/50) 2.05 min (10/90) 2.5 min (10/90) 2.55 min (100/0) 1 cycle; 5 min
Flow Rate:	0.4 mL/min
Column Temperature:	40 °C
Wavelength:	200 ~ 900 nm
Injection Volume:	1 μ L
Standard Sample:	9 Food coloring standards

Results

The chromatogram of a food coloring standard mixture and a contour plot are shown in figure 1. Good separation of nine ingredients was obtained within 2.5 minutes.

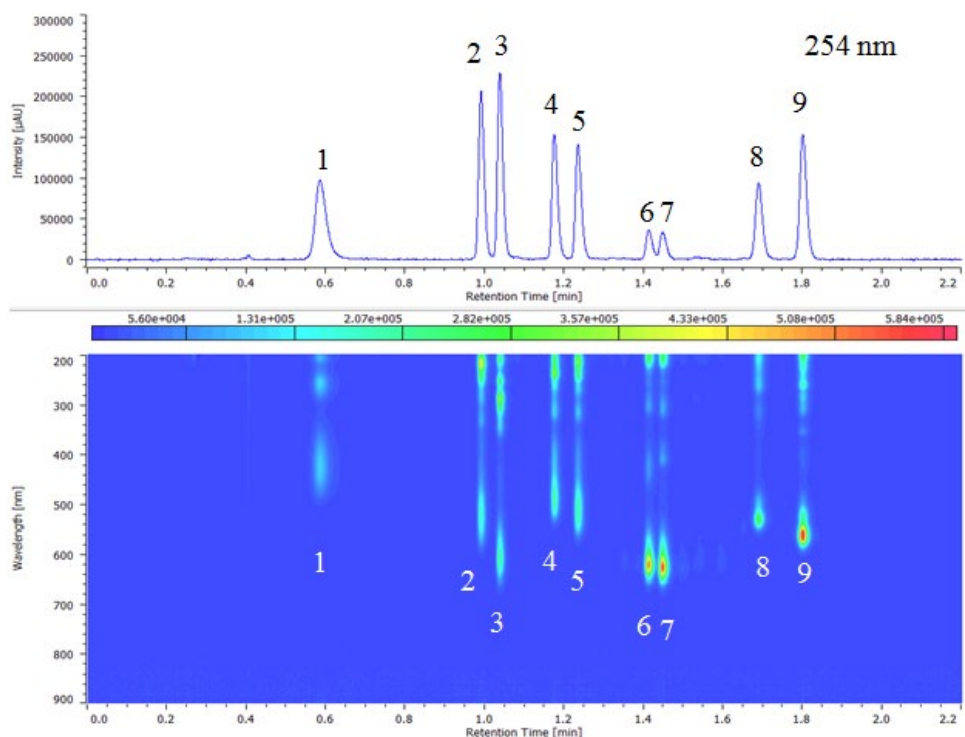


Figure 1. Chromatogram of a food coloring standard mixture.

1: Tartrazine (Y4), 2: Amaranth (R2), 3: Indigotine (B2), 4: Sunset Yellow FCF (Y5),
5: Allura Red AC (R40), 6: Fast Green FCF (G3), 7: Brilliant Blue FCF (B1), 8: Erythrosine (R3),
9: Acid Red (R106)

The on-peak spectra of the food coloring standard mixture are shown in figure 2. Good spectrum of each ingredient was obtained and the maximum absorbance wavelength for each is shown along with the maximum absorbance chromatogram below.

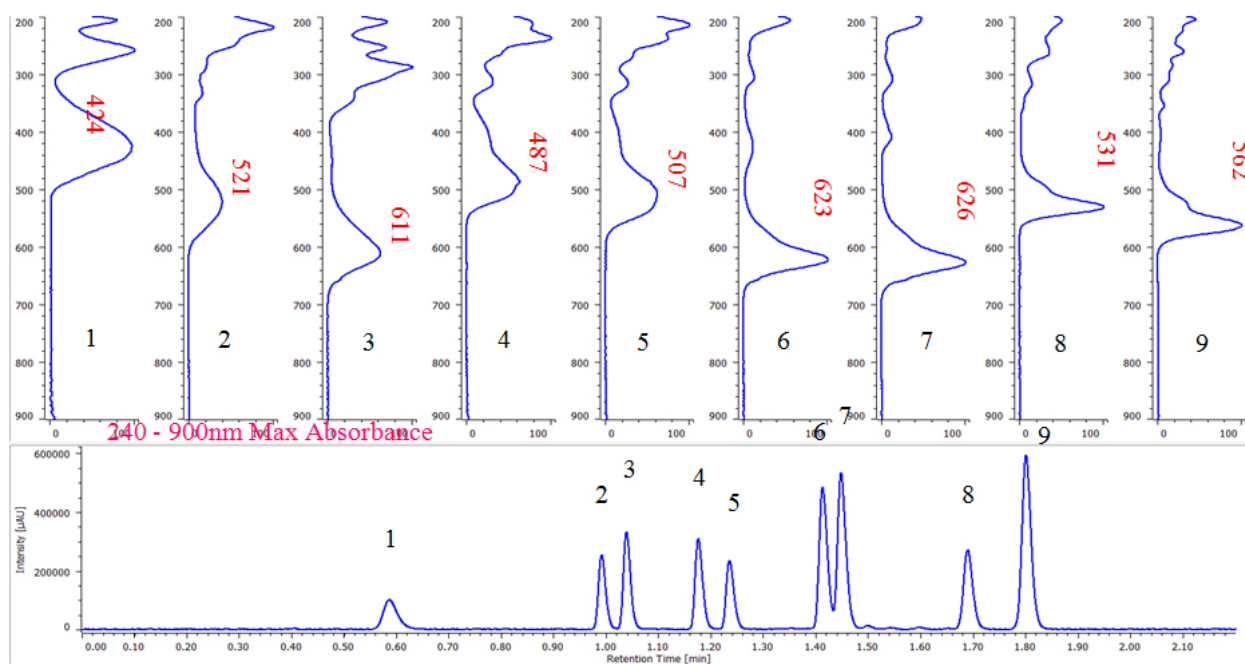


Figure 2. On-peak spectra of the food coloring standard mixture and maximum absorbance plot.

- 1: Tartrazine (Y4),
- 2: Amaranth (R2),
- 3: Indigotine (B2),
- 4: Sunset Yellow FCF (Y5),
- 5: Allura Red AC (R40),
- 6: Fast Green FCF(G3),
- 7: Brilliant Blue FCF (B1), 8: Erythrosine (R3), 9: Acid Red (R106)

The chromatogram of the powdered juice and the contour plot are shown in figure 3, while the spectrum search results of each peak are shown in figure 4. When the spectra of the standard mixture peaks in figure 2 were compared to those spectra in figure 3, a good correlation coefficient such as 0.990 ~ 1.000 was obtained for each peak shown in figure 4.

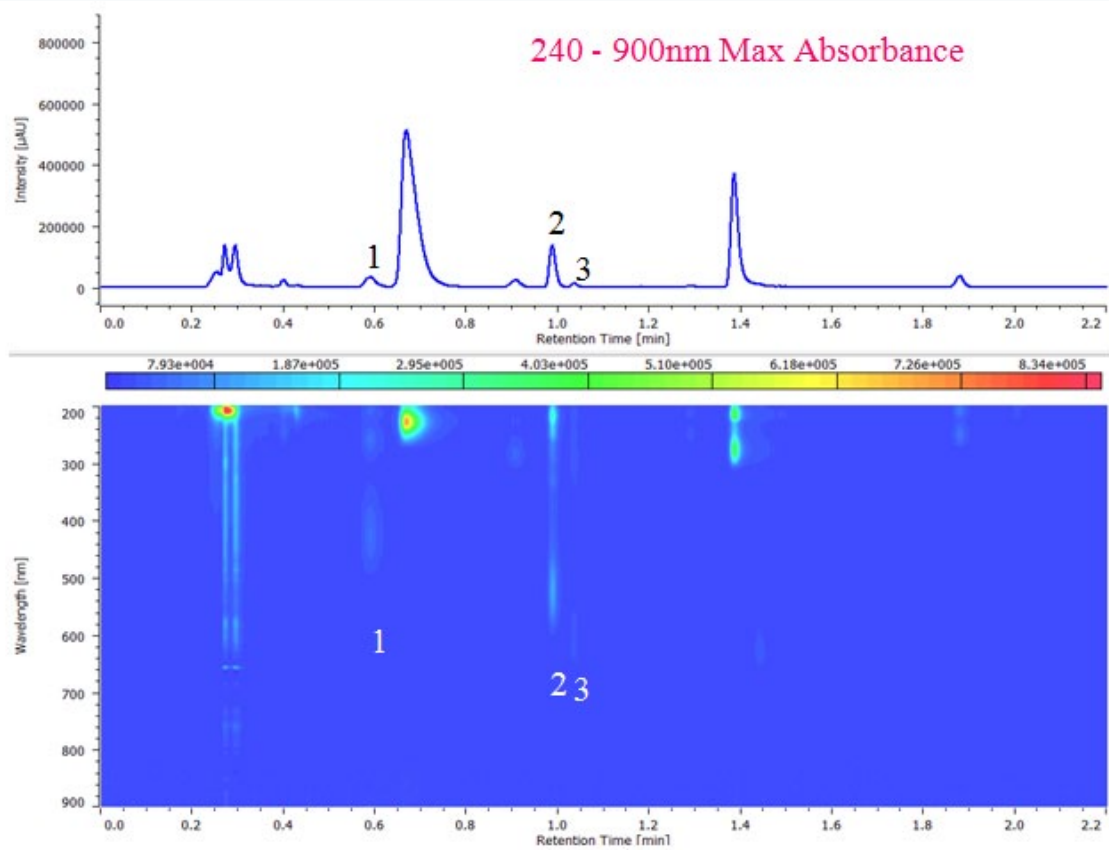


Figure 3. Chromatogram of the components in the powdered juice.
1: Tartrazine (Y4), 2: Amaranth (R2), 3: Indigotine (B2)

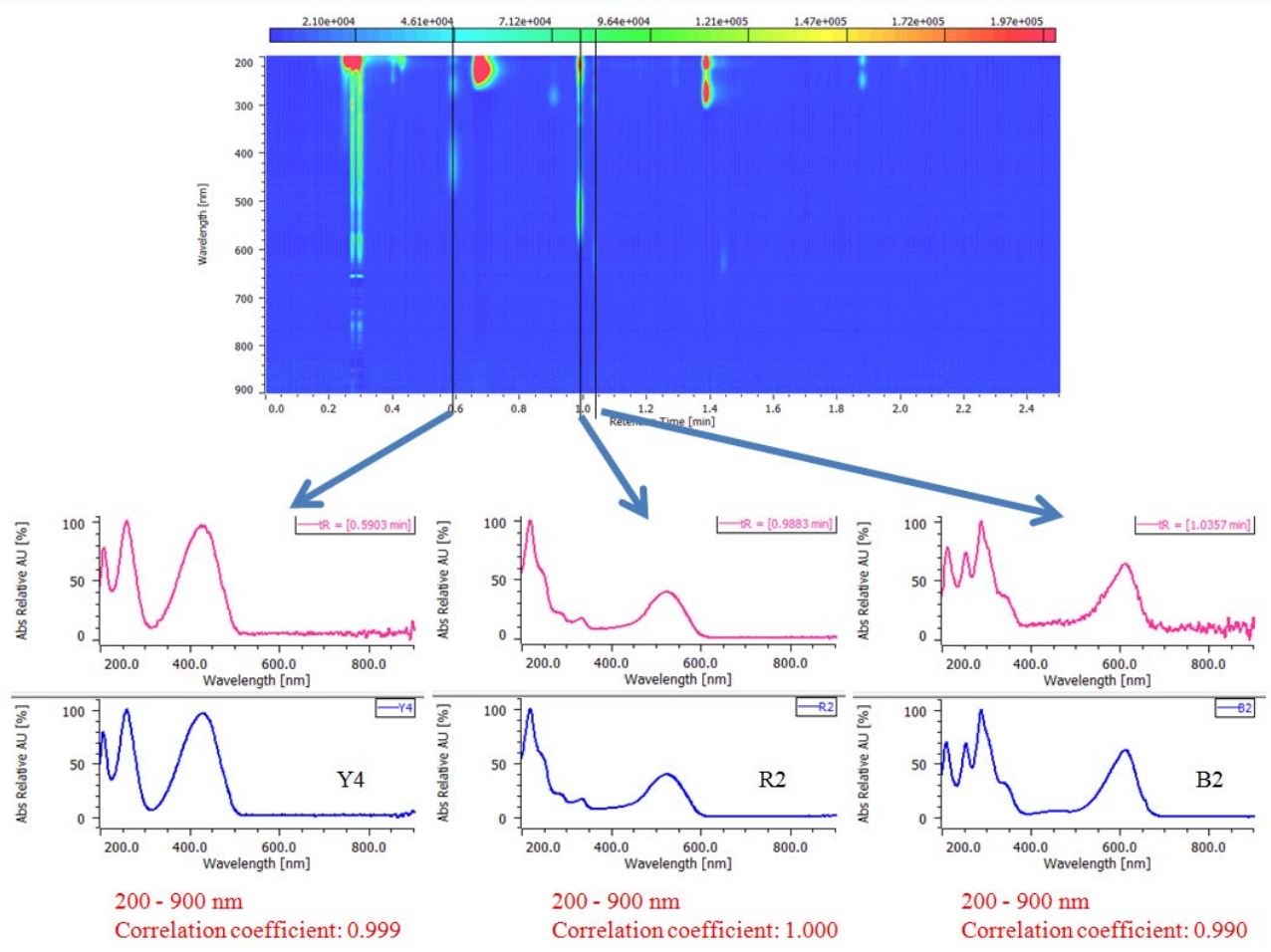


Figure 4. Spectrum search results of the components in the powdered juice.