# Application Note

620019X

## High Speed Analysis of Food Colorings in Powder Juice by Ultra High-performance Liquid Chromatography with Photodiode Array Detection

### Introduction

The food colorings are food additives used to give coloring to food and there are chemically synthesized ones and natural ones. Among those food colorings, there are ones for which evaluation of the effect to health is performed and also the ones which are approved by Food Sanitation Law specifying the standard of components and usage.

This time some food colorings in powder juice were analyzed using Ultra High-performance Liquid Chromatography (UHPLC) with PDA detector, which enables ultra high-speed data sampling such as100 spectra/sec data acquisition.

**Keyword :** UHPLC, Powder juice, Food Colorings , 2.0 µm, C18 Culumn, PDA detector

### Experimental

| [Equipment] | | [Conditions] | |
|---|---|---|---|
| Pump: | X-LC 3185PU x2 | Column: | X-PressPak V-C18 |
| Degasser: | X-LC 3080DG | | (2.0 mm I.D. x 50 mmL, 2.0 µm) |
| Mixer: | X-LC 3180MX | Eluent A: | 0.01M Ammonium acetate/Acetonitrile (95/5) |
| Column Oven: | X-LC 3067CO | Eluent B: | Acetonitrile |
| Autosampler: | X-LC 3195AS | Gradien Condition: | (A/B), 0 min (100/0)→ 1.0 min (50/50)→ |
| Detector: | X-LC 3110MD | | 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 µL |
| | | Standard Sample: | 9 Food coloring standards |

### Result

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

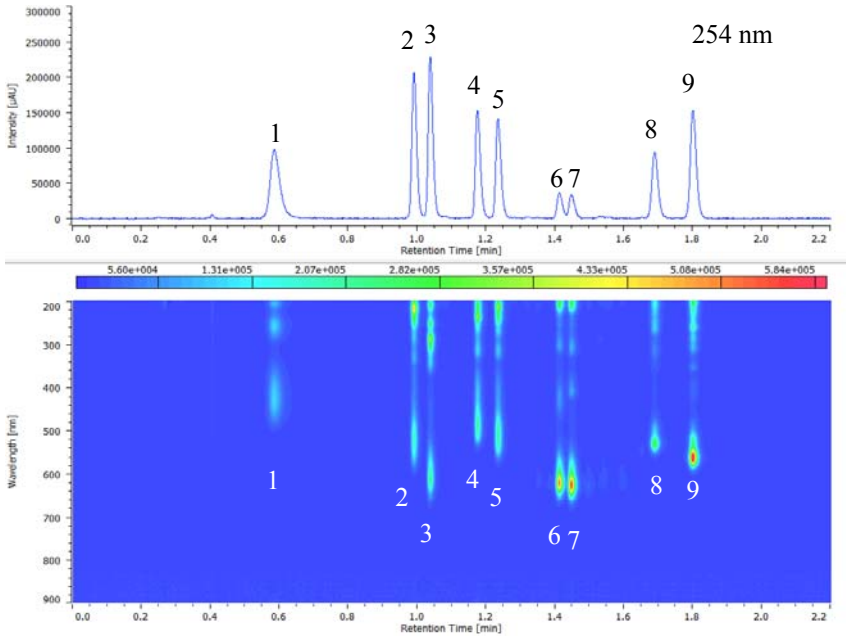


Fig. 1 Chromatogram of food coloring standard mixture

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)



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The on-peak spectra of food coloring standard mixture are shown in Fig. 2. Good spectrum of each ingredient was obtained.

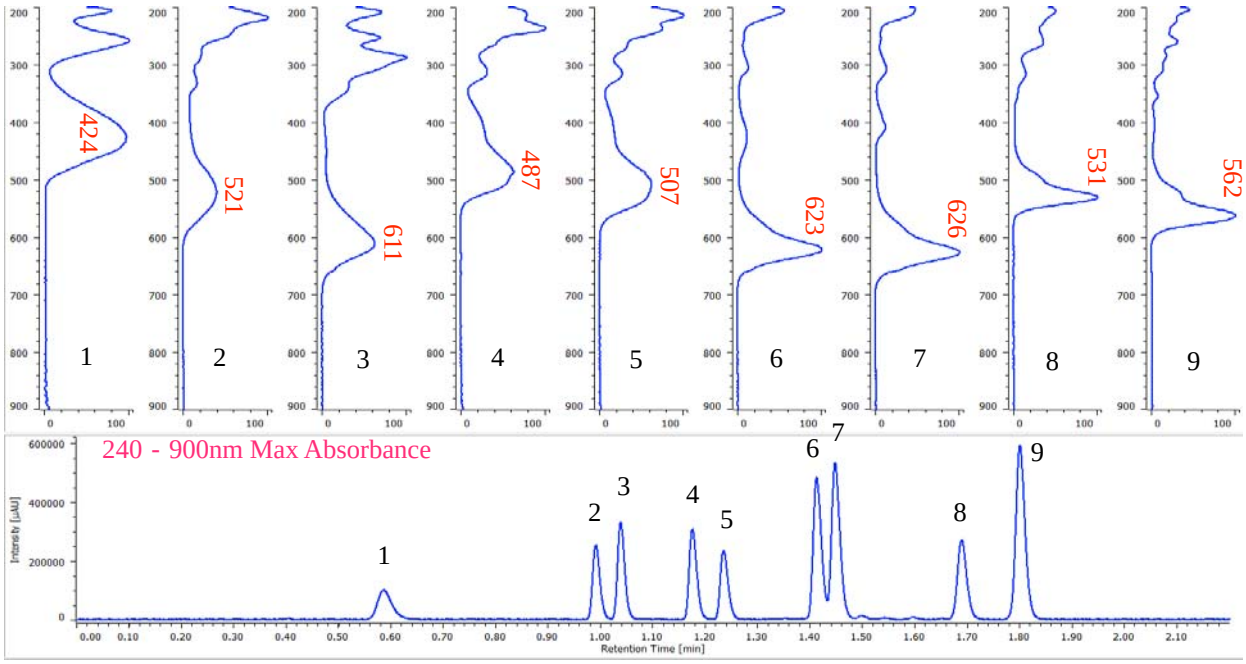


Fig. 2 On-peak spectra of food coloring standard mixture
1: Tartrazine (Y4), 2: Amaranth (R2), 3: Indigotine (B2), 4: Sunset Yellow FCF (Y5), 5: Allura Red AC (R40), 6: Fast Green FCF (G3), 7: Brilliant Blue FCF (B1), 8: Erythrosine (R3), 9: Acid Red (R106)

The chromatogram of powder juice and a contour plot are shown in Fig. 3 and the spectrum search results of each peak are shown in Fig. 4.

When the spectra of the standard mixture as shown in Fig. 2 were registered and correlation with the spectrum of each peak in Fig. 3 was calculated, as a result, good correlation coefficient such as 0.990 ~ 1.000 was obtained for each peak.

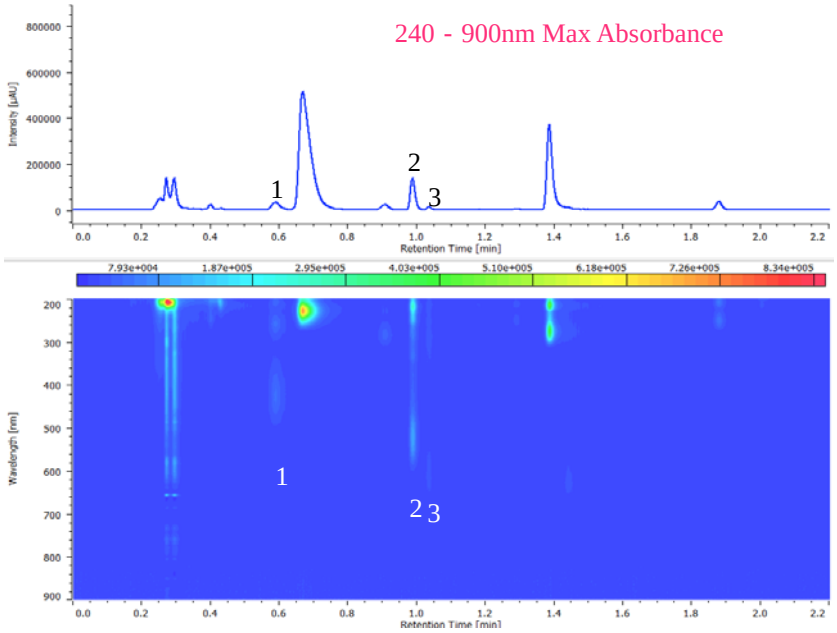


Fig.3 Chromatogram of components in powder juice
1: Tartrazine (Y4), 2: Amaranth (R2), 3: Indigotine (B2)



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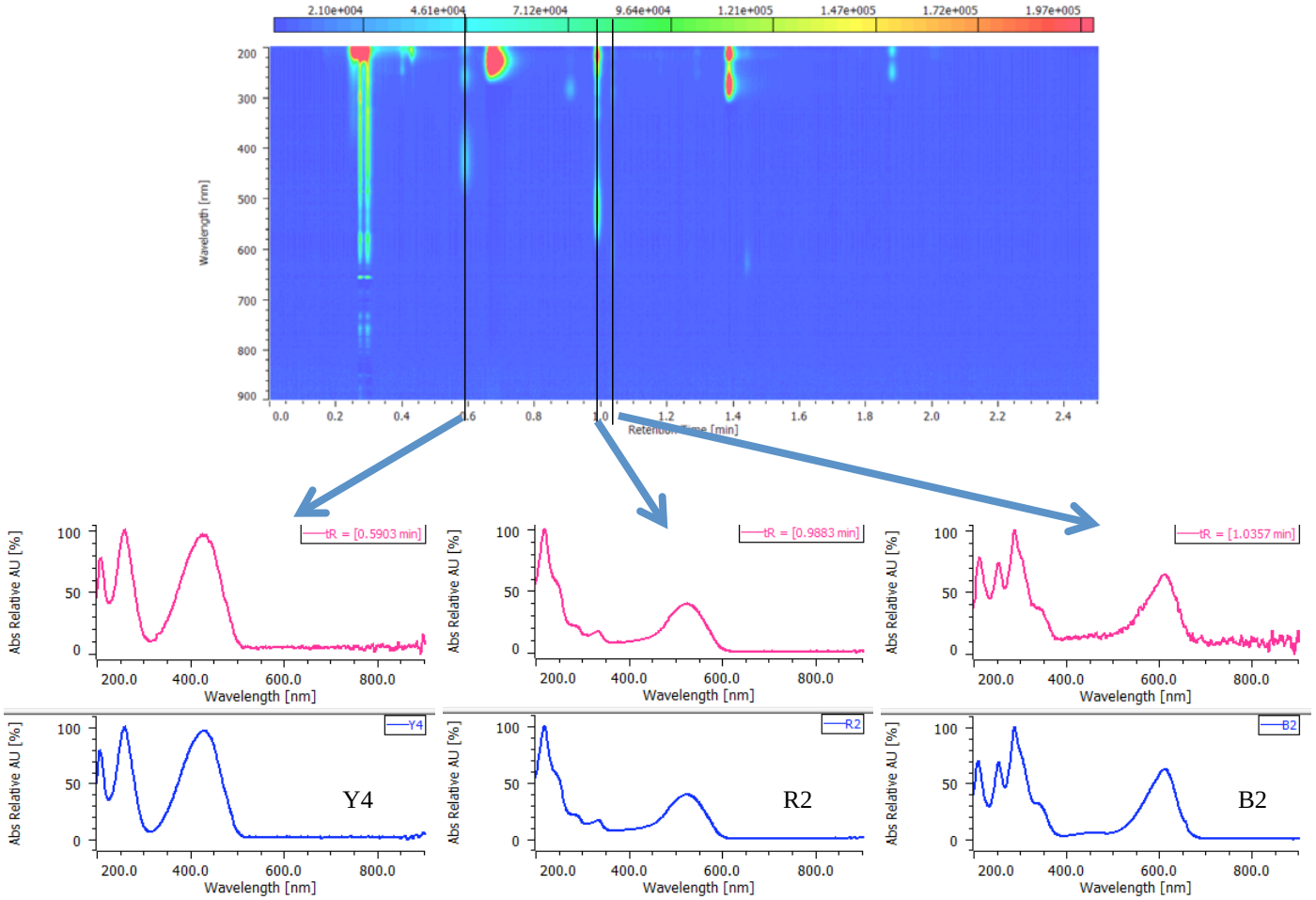


200 - 900 nm
Correlation coefficient: 0.999

200 - 900 nm
Correlation coefficient: 1.000

200 - 900 nm
Correlation coefficient: 0.990

Fig. 4 Spectrum search results of components in powder juice



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