

Ultra-High Speed Separation of Food Additives in Soft Drink Using Extreme High Pressure Liquid Chromatography System (λ -LC[®]) with 4 λ -UV Detector

Introduction

Food additives are substances added to food as preservatives, antioxidants, emulsifiers, etc. Recent increases in consumption of processed foods has led to the introduction more additives. Securing food safety demands determination of these additives and high performance liquid chromatography (HPLC) has been used for the measurement of these food additives.

We examined the usefulness of an X-PressPak V-C (2.0 mm I.D. x 50 mm L.) packed with 2 μ m diameter packing material for the ultra-high speed separation of food additives. We used 4 λ -UV detector for the simultaneous monitoring of these additives at four different wavelengths. The results were examined to determine whether the performance of the column and chromatography system exceeds those of conventional HPLC.

Experimental

The system utilized in this experiment was a JASCO λ -LC system consisting of two of the 3085PU pump, 3080DG mobile phase degasser, 3080MX mixing unit, 3067CO column oven, 3177UV 4 λ -UV detector, 3059AS autosampler, and ChromNAV chromatography data system.

The method was applied to the analysis of soft drinks. The soft drink was purchased at a grocery store, diluted 5 times with a mixture of 0.3% phosphoric acid / acetonitrile (95/5), and then filtered with 0.2 μ m membrane filter.

Results and Discussion

Figure 1 shows an λ -LC chromatogram of a standard mixture of 11 food additives. The λ -LC system provides 5 times shorter analysis time than conventional HPLC without sacrificing the resolution.

Figure 2 shows an λ -LC chromatogram of the soft drink sample. Eleven food additives were clearly separated from unidentified peaks.

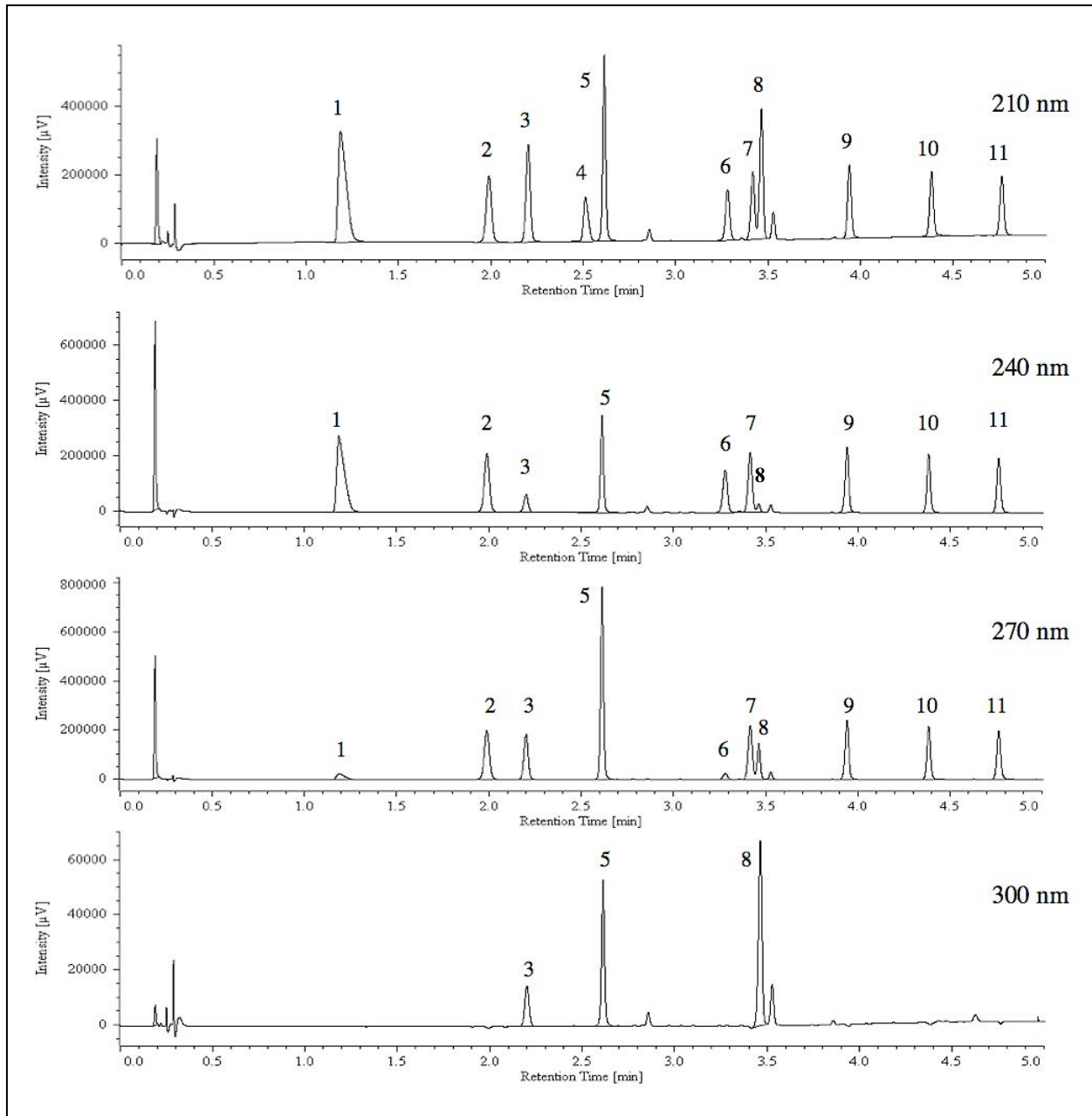


Figure 1 X-LC chromatogram of a standard mixture of food additives

Peaks: 1=acesulfame K (0.2 mg/mL), 2=p-hydroxybenzoic acid (0.05 mg/mL), 3=caffeine (0.05 mg/mL), 4=aspartame (0.1 mg/mL), 5=vitamin B2 (0.1 mg/mL), 6=benzoic acid (0.05 mg/mL), 7=methylparaben (0.05 mg/mL), 8=propyl gallate (0.05 mg/mL), 9=ethylparaben (0.05 mg/mL), 10=propylparaben (0.05 mg/mL), 11=butylparaben (0.05 mg)

Chromatographic conditions: column=X-PressPak V-C18 (2.0 mmID x 50 mmL, 2 μm); column temperature=40° C; mobile phase: A=0.3% phosphoric acid, B=acetonitrile, 0min=A/B(95/5), 1.3min=A/B(85/15), 1.7min=A/B(85/15), 5min=A/B(30/70), 5.1 min=(10/90), 6 min=(10/90), 6.1 min=(95/5), injection interval=8 min; flow rate=0.5 mL/min; detection wavelengths=210 nm, 240 nm, 270 nm, 300 nm, injection volume=1 μL

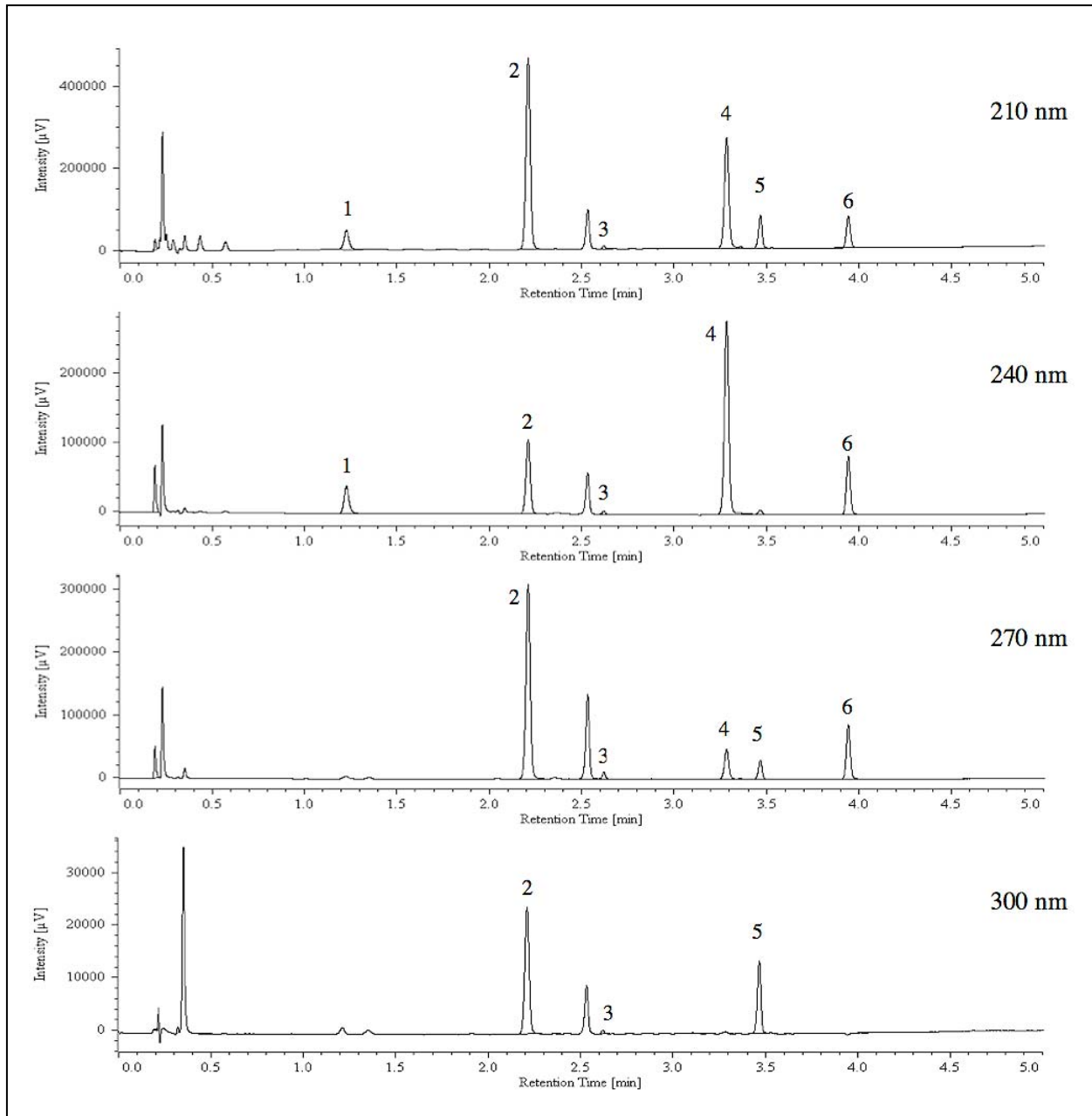


Figure 2 X-LC chromatogram of soft drink

The sample is diluted 5 times with 0.3% phosphoric acid/acetonitrile(95/5), and filtered with 0.2 μm membrane filter. The other conditions are the same as in the Figure 1 caption.