Application Note

520016X

High-Speed Analysis of Catechins in Green Tea by Ultra High-performance Liquid Chromatography with Photodiode Array Detection

Introduction

Catechins are of polyphenol group contained in green tea that give bitter taste. They have various physiological functions are reported such as inhibitory for high blood pressure, control of blood cholesterol, control of blood-sugar level, antioxidative, anti-aging, anti-bacterial and anti-allergic activities. Main constituents of Catechins in Green tea are epicatechin, epigallocatechin, epicatechin gallate, and epigallocatechin gallate.

In this report, catechins in green tea were measured and analyzed by Ultra High-performance Liquid Chromatography(UHPLC) with Photodiode Array Detection, which has high-speed data acquisition rate at 100 spectra/sec.

Keyword: UHPLC, Green tea, Catechine,1.8 mm, C18 Column, PDA detector

Experimental

Equipment.		Conditions.	
Pump:	X-LC 3185PU x 2	Column:	ZORBAX SB-C18 (3.0 mmID x 50 mmL, 1.8 µm)
Degasser:	X-LC 3080DG	Eluent A:	0.2% Phosphoric acid in Water/Acetonitrile (90/10)
Mixer:	X-LC 3180MX	Eluent B:	0.2% Phosphoric acid in Water/Acetonitrile (50/50)
Column oven:	X-LC 3067CO	Gradient condition:	(A/B), 0 min(100/0)→ 4 min(70/30)→ 4.5 min(70/30)
Autosampler:	X-LC 3159AS		→4.55 min(0/100)→5 min(0/100)→5.05 min(100/0)
Detector:	X-LC 3110MD		1 cycle; 7.5 min
		Flow rate:	0.8 mL/min
		Column temp.:	30ºC
		Wavelength:	200-400 nm
		Injection volume:	1 mL
		Standard sample:	6 catechins and caffeine

Fig. 1 shows chemical structures of 6 catechins and caffeine.

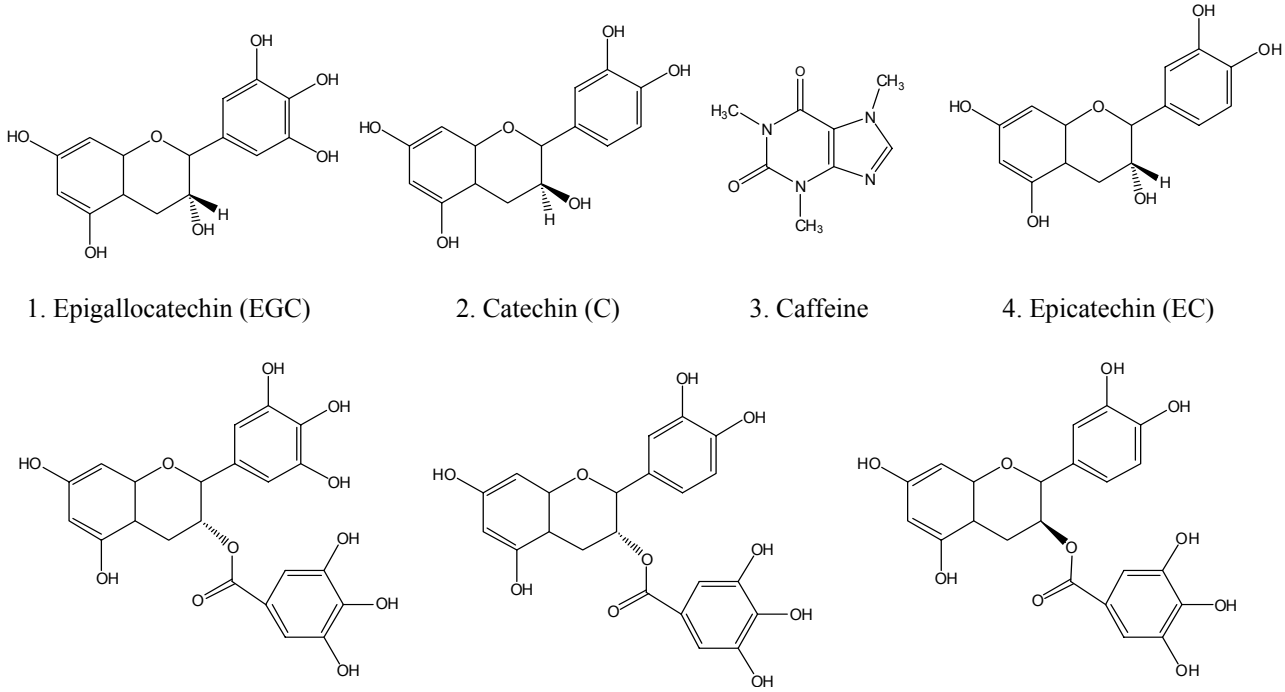

Fig. 1. Chemical structures 6 catechins and caffeine.

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Results

Fig. 2 shows a chromatogram and a contour plot of 6 catechines and caffeine. It shows that 7 different constituents are completely separated within 4 min.

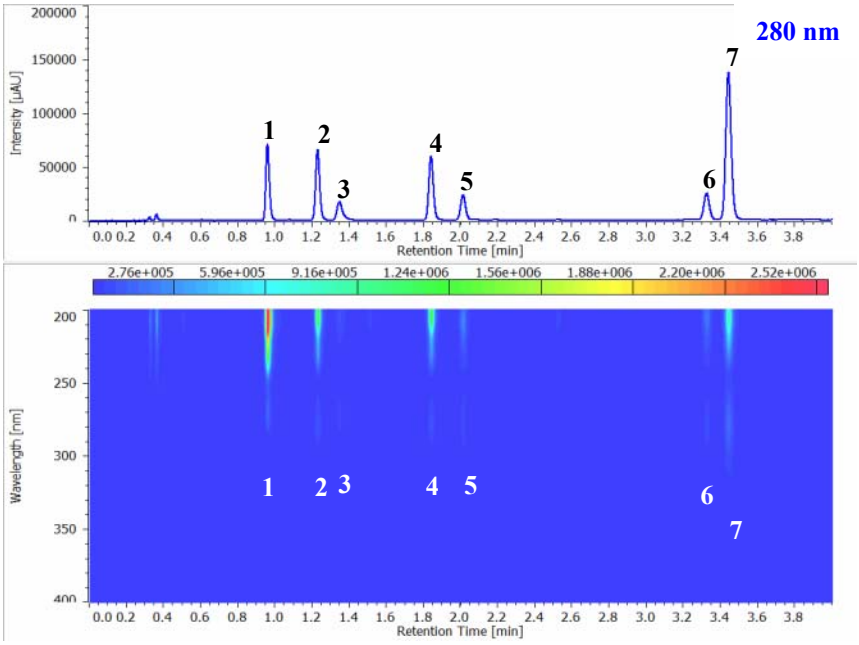

Fig. 2. Chromatogram and contour plot of 6 catechines and caffeine. 1: EGC (500 µg/mL), 2: C (100 µg/mL), 3: Caffeine (10 µg/mL), 4: EC (100 µg/mL), 5: EGCG (25 µg/mL), 6: ECG (20 µg/mL), 7: CG (100 µg/mL)

Fig. 3 shows a chromatogram and contour plot of Green tea. It shows that 7 different constituents and impurities were separated properly.

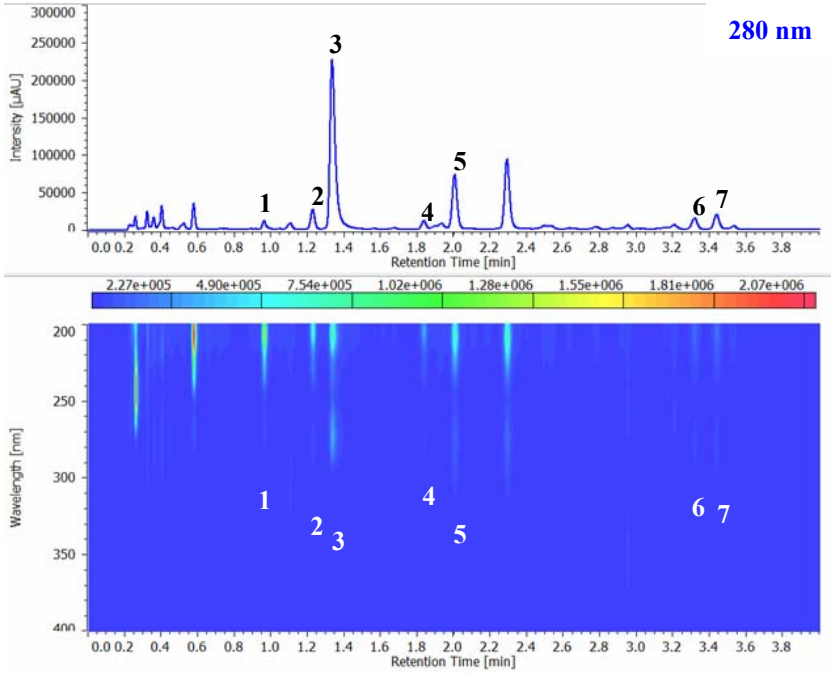

Fig. 3. Chromatogram and contour plot of green tea extract. The peak numbers and corresponding compounds are the same as in Fig. 2.

Sample preparation. The sample was filtered using 0.2 mm membrane filter.

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