



## High-Speed Analysis of Catechins in Green Tea using UHPLC

### Introduction

Catechins are in a polyphenol group contained in green tea that yield a bitter taste. They have various physiological functions and have been reported to inhibit high blood pressure, control blood cholesterol, control blood-sugar level, and provide antioxidative, anti-aging, anti-bacterial and anti-allergic activities. The 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



Keywords: UHPLC, Green tea, Catechine, 1.8 mm, C18 Column, PDA detector, epicatechin, epigallocatechin, epicatechin gallate, epigallocatechin gallate, antioxidant, antibacterial, blood pressure, blood sugar, cholesterol

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## Experimental

## Equipment

Pump:	X-LC 3185PU x 2
Degasser:	X-LC 3080DG
Mixer:	X-LC 3180MX
Column oven:	X-LC 3067CO
Autosampler:	X-LC 3110MD

## Conditions

Column:	ZORBAX SB-C18 (3.0 mmID x 50 mmL, 1.8 $\mu$ m)
Eluent A:	0.2% Phosphoric acid in Water/Acetonitrile (90/10)
Eluent B:	0.2% Phosphoric acid in Water/Acetonitrile (50/50)
Gradient condition:	(A/B), 0 min(100/0) $\rightarrow$ 4 min(70/30) $\rightarrow$ 4.5 min(70/30) $\rightarrow$ 4.55 min(0/100) $\rightarrow$ 5 min(0/100) $\rightarrow$ 5.05 min(100/0) 1 cycle; 7.5 min
Flow rate:	0.8 mL/min
Column temperature	30°C
Wavelength:	200-400 nm
Injection volume:	1 mL
Standard sample:	6 catechins and caffeine

Figure 1 shows the chemical structures of 6 catechins and caffeine.

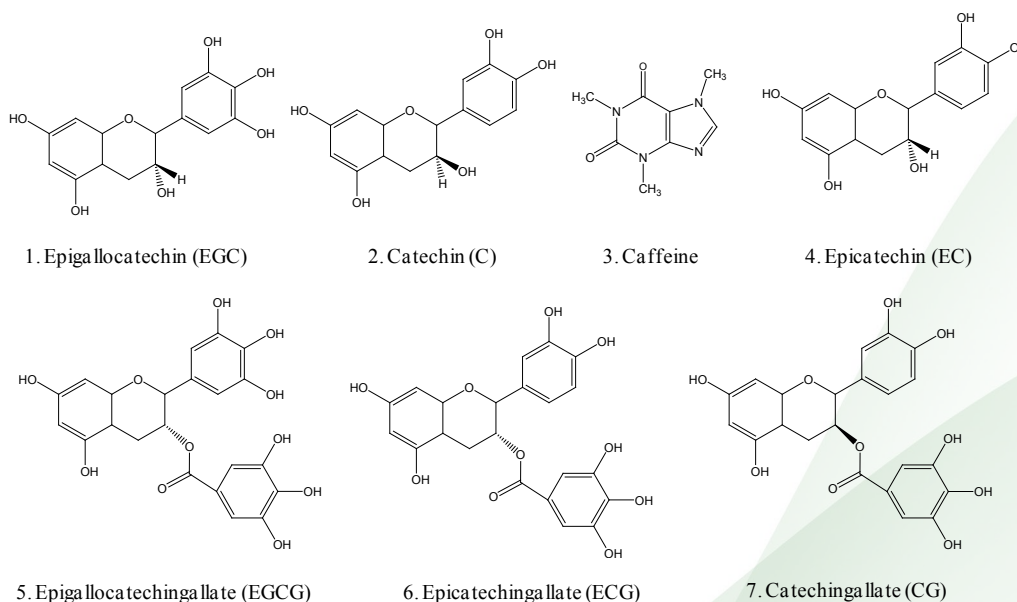


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## Results

Figure 2 shows a chromatogram and a contour plot of 6 catechins and caffeine. It shows that the 7 different constituents are completely separated within 4 minutes.

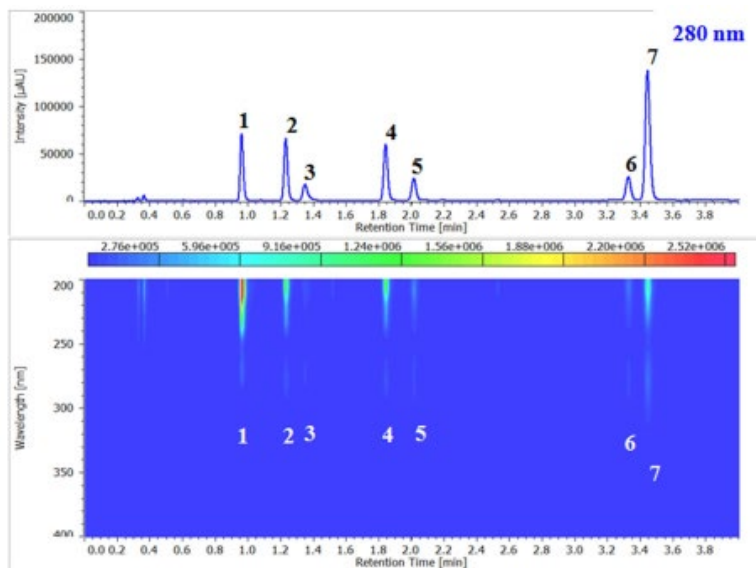


Figure 2. Chromatogram and contour plot of 6 catechins and caffeine. 1: EGC (500  $\mu\text{g}/\text{mL}$ ), 2: C (100  $\mu\text{g}/\text{mL}$ ), 3: Caffeine (10  $\mu\text{g}/\text{mL}$ ), 4: EC (100  $\mu\text{g}/\text{mL}$ ), 5: EGCG (25  $\mu\text{g}/\text{mL}$ ), 6: ECG (20  $\mu\text{g}/\text{mL}$ ), 7: CG (100  $\mu\text{g}/\text{mL}$ ).

Figure 3 shows a chromatogram and a contour plot of green tea. It shows that the 7 different constituents and impurities were separated properly.

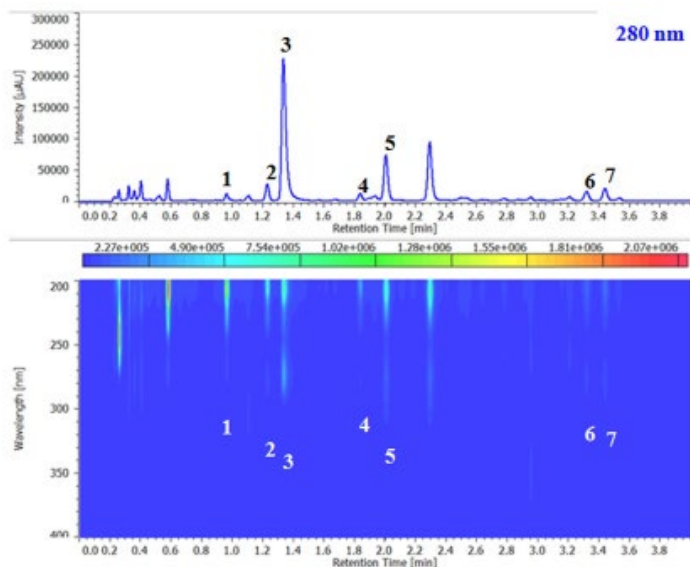


Figure 3. Chromatogram and contour plot of green tea extract. The peak numbers and corresponding compounds are the same as in figure 2.

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