

Application News

High Performance Liquid Chromatography

No.L373A

High Speed, High Resolution Analysis (Part 19) Analysis of Catechins in Green Tea Drink

Catechins and their antioxidant and anti-cancer effects have been reported in a number of scientific studies, and in particular, catechins that contain gallate are reported to have a dietary effect.

A wide variety of green tea drinks containing many

kinds of catechins have become commercially available in recent years. This Application News introduces a high-speed analysis of catechins in a green tea drink using the Prominence UFLC_{XR} ultra-fast, high-resolution LC system with a high-speed, high-resolution column.

■ Analysis of Standard Solution

Fig. 1 shows the structures of catechins and gallic acid, their decomposition product, in addition to caffeine, a widely used additive in green tea drinks.

Fig. 2 shows a chromatogram of a standard mixture of 10 substances including catechins normally found

in green tea drinks (100 mg/L, each), which were analyzed with a high speed and high resolution HALO[®] C18 column (particle size 2.7 μ m) from AMT Ltd. Table 1 shows the analytical conditions.

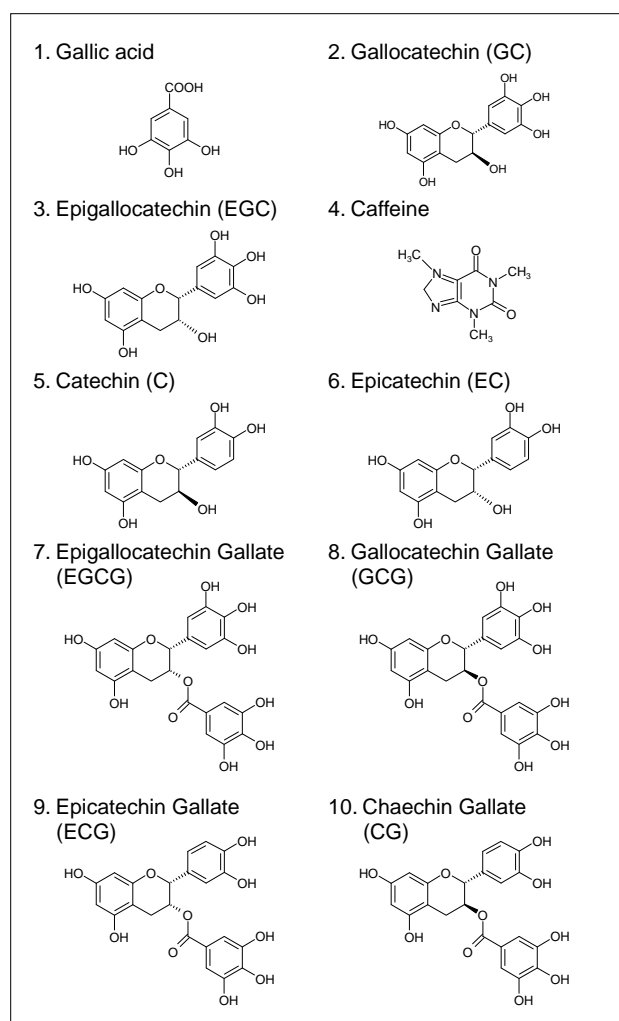


Fig. 1 Structures of Catechins, Gallic Acid and Caffeine

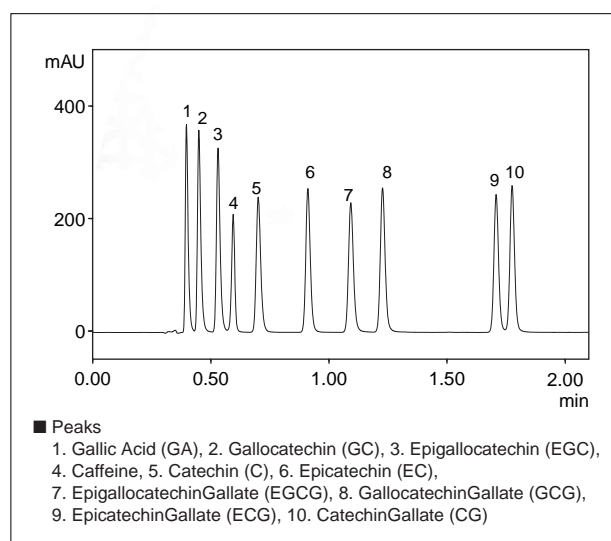


Fig. 2 Chromatogram of a Standard Mixture of Catechins, Gallic Acid, and Caffeine (100 mg/L, 2 μ L injected)

Table 1 Analytical Conditions

Column	: HALO [®] C18 (75 mmL. \times 3.0 mmI.D., 2.7 μ m)
Mobile Phase	: A; 0.2 % Phosphoric acid in water / Tetrahydrofuran = 99 / 1 (v/v) B; Acetonitrile / Tetrahydrofuran = 99 / 1 (v/v) B conc. 12 % (0 min) \rightarrow 25 % (2 min) \rightarrow 5 % (2.01-2.1 min)
Flow Rate	: 1.0 mL/min
Column Temp.	: 40 $^{\circ}$ C
Injection Volume	: 2 μ L
Detection	: SPD-M20A at 230 nm
UV Cell	: Semi-micro cell

■ Linearity

Fig. 3 shows the calibration curves for some of the typical 10 constituents of green tea drinks, including gallic acid, gallic catechin, caffeine and epigallocatechin gallate (1 - 250 mg/L each, 2 μ L injected). Excellent linearity was obtained for all of the components, with an R^2 value of 0.9999 or greater.

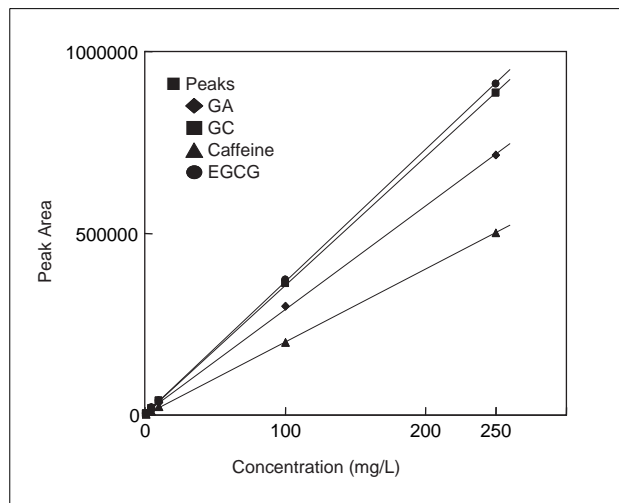


Fig. 3 Linearity

■ Repeatability

Table 2 shows the repeatability ($n=6$) of the retention time and peak area of the catechins and other mixture (100 mg/L each).

Table 2 Repeatability of Peak Area and Retention Time of Catechins, Gallic Acid, and Caffeine

Compounds	Retention Time	Peak Area
	%RSD	%RSD
Gallic Acid	0.21	0.34
Gallic catechin	0.31	0.36
Epigallocatechin	0.26	0.38
Caffeine	0.21	0.72
Catechin	0.15	0.32
Epicatechin	0.12	0.36
Epigallocatechin Gallate	0.14	0.39
Gallic catechin Gallate	0.14	0.35
Epicatechin Gallate	0.09	0.42
Catechin Gallate	0.08	0.54

■ Analysis of Green Tea Drink

Fig. 4 and Fig. 5 show the chromatograms of commercial green tea drinks A and B, respectively. The analytical conditions were the same as those of Table 1. After preparing a 12-fold and 4-fold dilution of green

tea drinks A and B, respectively, they were passed through a membrane filter (pore size 0.22 μ m), then 2 μ L were injected.

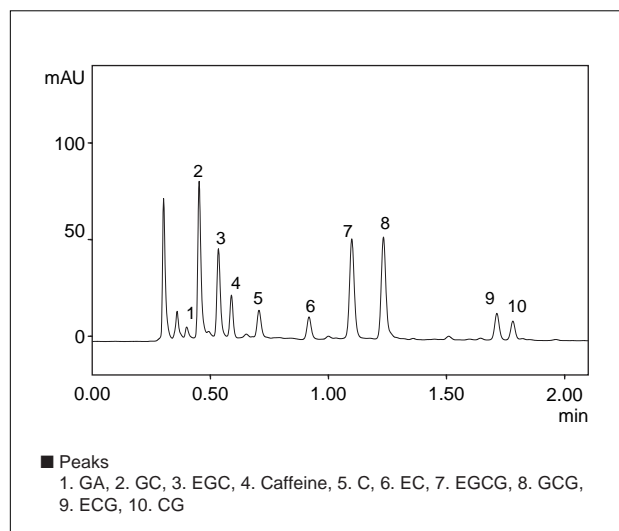


Fig. 4 Chromatogram of Green Tea Drink A

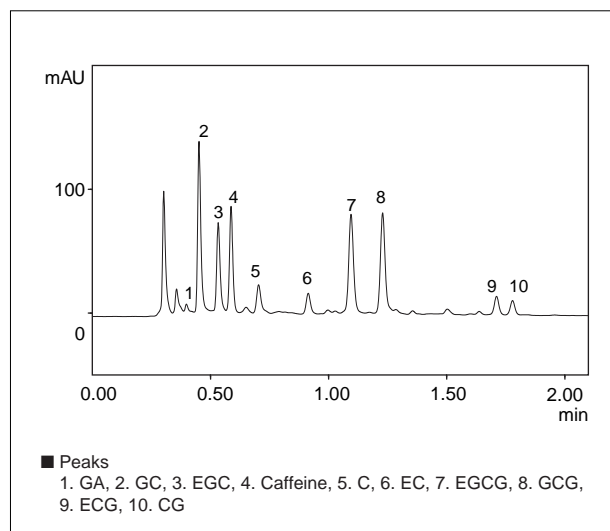


Fig. 5 Chromatogram of Green Tea Drink B

NOTES:

*This Application News has been produced and edited using information that was available when the data was acquired for each article. This Application News is subject to revision without prior notice.



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