

## Analysis of Catechins and Caffeine in Green Tea

### Introduction

Green tea which is routinely drunk in Japan contains catechins and caffeine as its ingredients. Four kinds of catechins including epicatechin, epigallocatechin, epicatechin gallate and epigallocatechin gallate are mainly contained in green tea, and it has been reported that body fat reducing effect can be seen by ingesting high concentration tea catechin group for a long period. Catechin, catechingallate, etc. are also a kind of catechins. Catechin has antioxidant effect, and the effect of preventing oxidation of LDL cholesterol has been confirmed. Among these catechins, gallate type catechins act to suppress absorption by inhibiting the function of enzymes that digest fat and cholesterol.

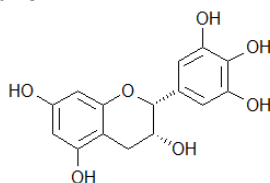
In this report, catechins and caffeine in green tea were measured.

Keyword : Catechins, caffeine, green tea, Unifinepak C18, UV detector

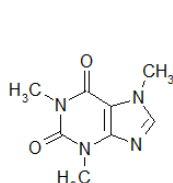
### Experimental condition

Column:	Unifinepak C18 (4.6 mmI.D. x 150 mmL, 5 μm)
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) => 5 min (100/0) => 30 min (70/30) => 30.1 min (0/100) => 35 min (0/100) => 35.1 min (100/0) 1 cycle: 50 min
Flow rate:	1.0 mL/min
Column temp.:	30°C
Wavelength:	280 nm
Injection volume:	10 μL
Standard Sample:	Catechins and caffeine mixture (EGC, Cg: 20 μg/mL each) (Caf, C, EC, EGCg, ECg: 10 μg/mL each)

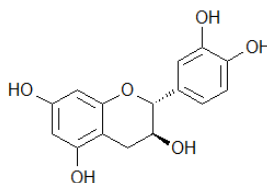
### Structure



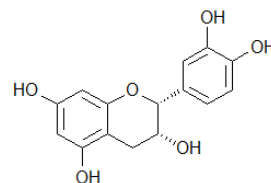
Epigallocatechin (EGC)



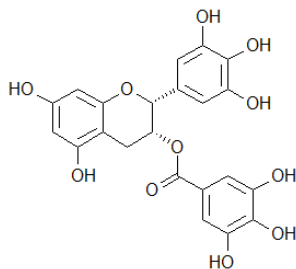
Caffeine (Caf)



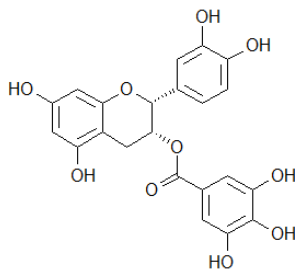
Catechin (C)



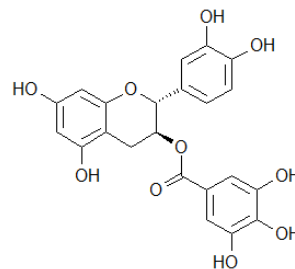
Epicatechin (EC)



Epigallocatechin gallate (EGCg)



Epicatechin gallate (ECg)



Catechin gallate (Cg)

## Results

The chromatogram of catechins and caffeine is shown in Figure 1. Good separation of 6 kinds of catechins and caffeine has been obtained.

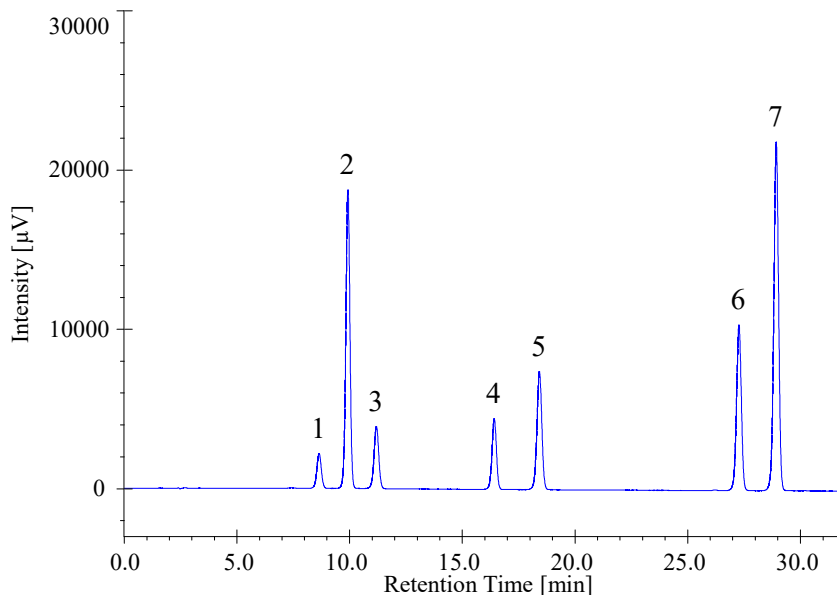


Fig. 1 Chromatogram of standard catechins and caffeine standard sample  
1: EGC, 2: Caf, 3: C, 4: EC, 5: EGCg, 6: ECg, 7: Cg

Figure 2 shows the chromatogram of green tea.

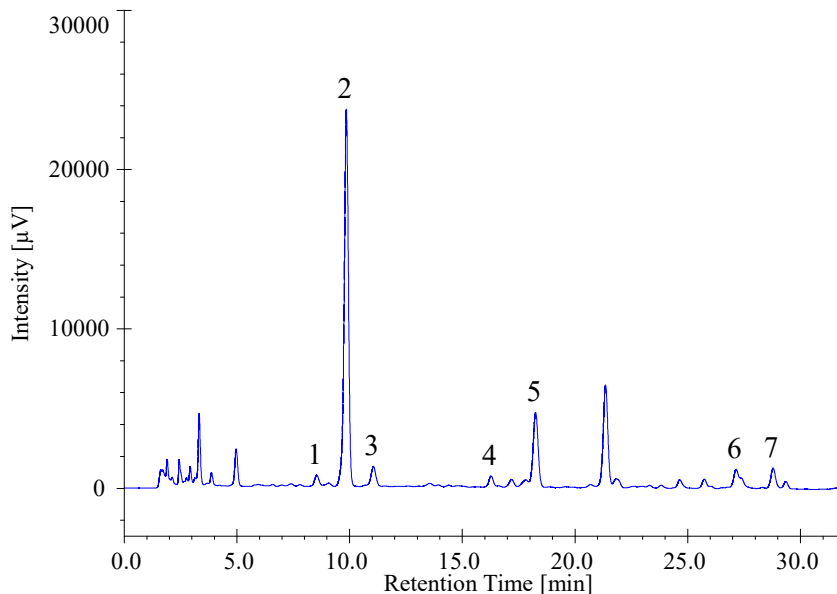


Fig. 2 Chromatogram of green tea

Sample preparation: Dilute commercially available green tea in a plastic bottle by 10 times, then filtrate by 0.45  $\mu\text{m}$  membrane filter

1: EGC, 2: Caf, 3: C, 4: EC, 5: EGCg, 6: ECg, 7: Cg