Analysis of Cyclodextrins in Instant Food:

Application example using an evaporative light scattering detector (ELSD)

Cyclodextrins are cyclic oligosaccharides bound to D-glucose units, which, by including a guest molecule in the hollow portion of their structure, have the ability to change the properties of the guest molecule. Taking advantage of this property, cyclodextrins are widely used as food additives serving a variety of functions such as changing volatile substances into to refractory substances, changing poorly soluble substances into substances that are readily soluble in water, and stabilizing unstable substances. Three types of cyclodextrins are used in Japan, with α-, β-, and γ-cyclodextrin used with different numbers of D-glucose bonds.

Each of these cyclodextrins was separated using the HILIC mode and detected by ELSD. Also shown is an application example of the analysis of cyclodextrins in instant green tea. Using these analytical conditions, good separation of each of these cyclodextrins was able to be achieved. In addition, ELSD calibration curve data resulted in a polynomial approximation curve, similar to that of a charged particle detector. Figure 4 shows an example of a calibration curve for α-cyclodextrin.

Table 1. Analytical conditions

Column:	TSKgel Amide-80 3μm, 4.6mm ID x 15cm
Mobile phase:	A: water
	B: acetonitrile
	A/B = 35/65
Flow rate:	1.0mL/min
Detection:	ELSD (Agilent Technologies)
	Temp.: 40℃, Nebulize4 gas; N2, Gas pressure: 350kPa, Gain; 6
Temperature:	40°C
Injection vol.:	10μL

Figure 1. Chromatogram of cyclodextrins (0.5g/L each)

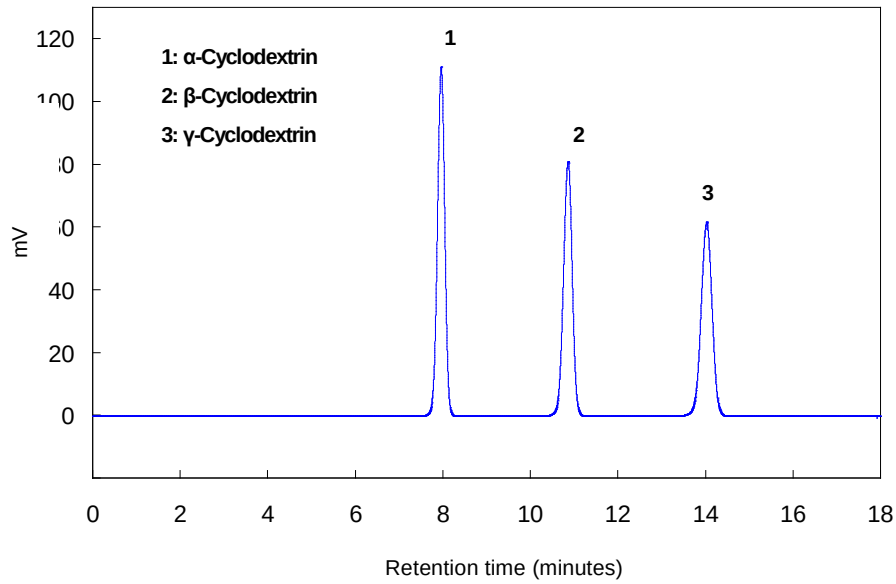

Figure 2. Preprocessing of instant green tea

Weigh out 0.5g of powdered green tea, and add 20mL water

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Mix, then let stand

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Filter the supernatant [Maishori Disc W-25-5 (cellulose acetate, pore size: 045μm)]

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Take 4mL of filtrate and make to 20mL with 50% acetonitrile aqueous solution

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After filtering (Maishori Disc H-25-5 (PTFE, pore size: 0.5μm), analyze the filtrate

Figure 3. Chromatogram of instant green tea

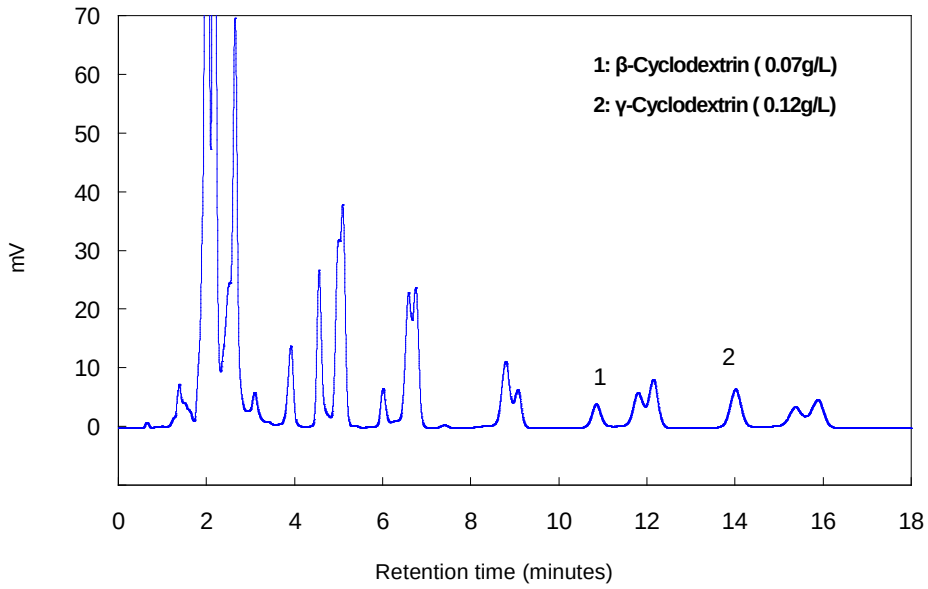
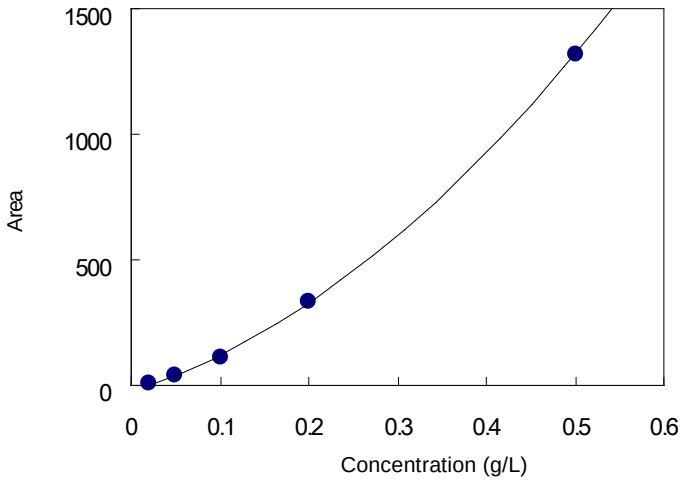


Figure 4. Calibration curve data (α-cyclodextrin)



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