

SHIMADZU APPLICATION NEWS

HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

No. L218

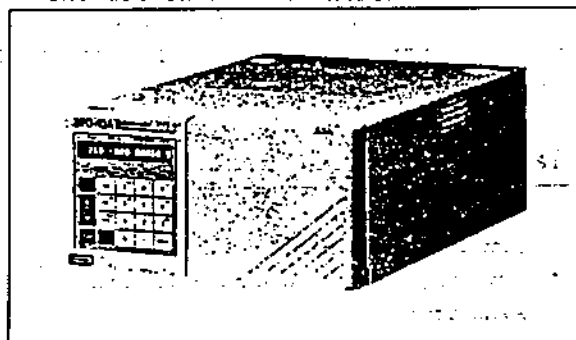
Analysis with Multi-functional SPD-10A UV-VIS Detector

The newly released multi-functional SPD-10A UV-VIS detector features the following.

- Highest S/N performance, noise level 1×10^{-5} AU or less
- Wavelength reproducibility of ± 0.1 nm
- Wide measuring wavelength range, 190 to 600 nm (190 nm to 900 nm in SPD-10AV)
- Long lamp life
- Automatic wavelength checking, calibrating function
- Simultaneous measurement of two wavelength, specific chromatographic output
- Setting of wavelength program by detector alone
- Wavelength scanning

It has the higher performances than our previous detector that was the best-seller.

Among these functions, the dual wavelength simultaneous detection function, specific chromatographic function for calculating the absorbance by dual wavelength simultaneous analysis, and the wavelength program function for varying the detection wavelength at desired time are introduced here.



■ Analysis in Dual Wavelength Detection Mode

This is an analysis of typical six water-soluble vitamins. The detection wavelength was set at 210 nm in Fig. 1, and 270 nm in Fig. 2. Calcium pantothenate is detected only in short wavelength region around 210 nm, but other vitamins may be detected more selectively at 270 nm. By the dual wavelength detection technique, multiple components may be determined simultaneously at high sensitivity by a single injection.

Table 1 Analytical Conditions

Column	: STR ODS-M (4.6mm I.D. × 150mm L.)	
Mobile Phase	: 100mM (sodium) phosphate (pH 2.1)	} ... 9
	containing in 0.8mM (sodium)	
	Octanesulfonate	
	Acetonitrile	} ... 1
Flow Rate	: 0.8ml/min	
Temperature	: 40°C	

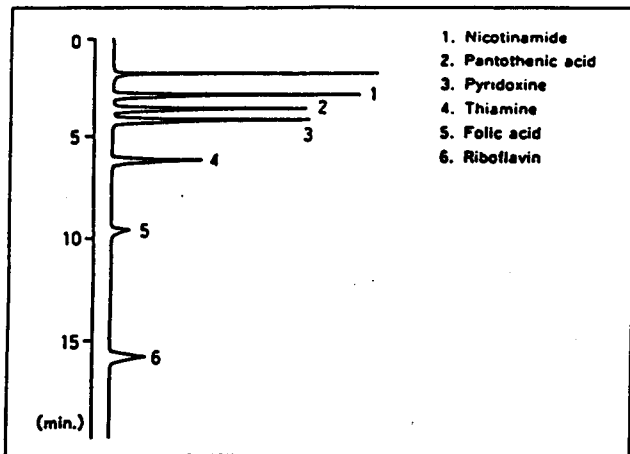


Fig. 1 Analysis of Water-Soluble Vitamin Detection at 210 nm

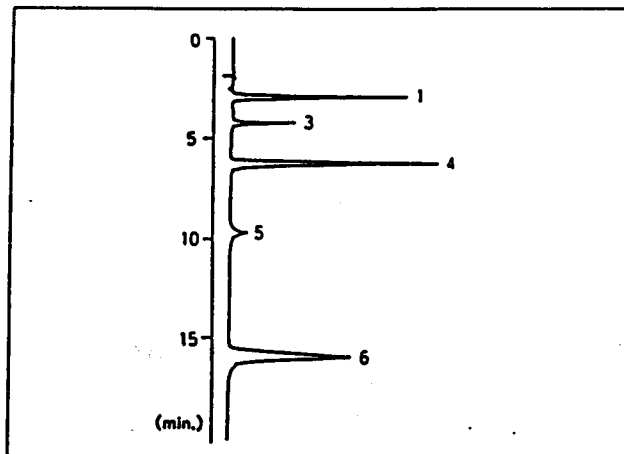


Fig. 2 Analysis of Water-Soluble Vitamin Detection at 270 nm

■ Analysis in Ratio-Chromatogram Detection Mode

This is an analysis of berberine, an active ingredient in powdered coptis rhizome, one of the crude drugs. Fig. 3 shows a chromatogram at maximum of 345 nm and a ratio-chromatogram at minimum of 365 nm in a long wavelength region of standard berberine, and Fig. 4 shows chromatogram and ratio-chromatogram in the same condition of the powdered coptis rhizome after pretreatment. When there is only one peak component, the top of the ratio-chromatogram is a flat plateau, and its height is the intrinsic height of the component. When the standard is available, the identification accuracy is further improved by the pattern comparison with the ratio-chromatogram peak, and the data reliability is enhanced.

Table 2 Analytical Conditions

Column	: STR ODS-M(4.6mm I.D. × 150mm L.)
Mobile Phase	: 10mM (sodium) phosphate (pH 2.6) containing in 200mM (sodium) perchlorate
	Acetonitrile
Flow Rate	: 1.0mL/min
Temperature	: 40°C
Detector	: Absorbance at 345nm (ratio-chromatogram at 345nm and 365nm)

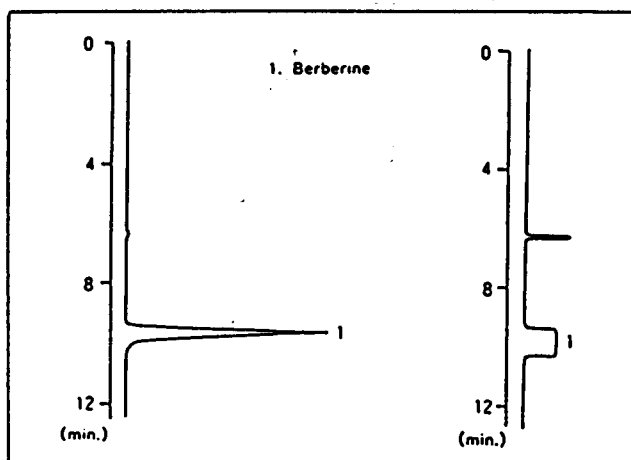


Fig. 3 Chromatogram of Berberine Standard (left) and the Corresponding Ratio-chromatogram (right)

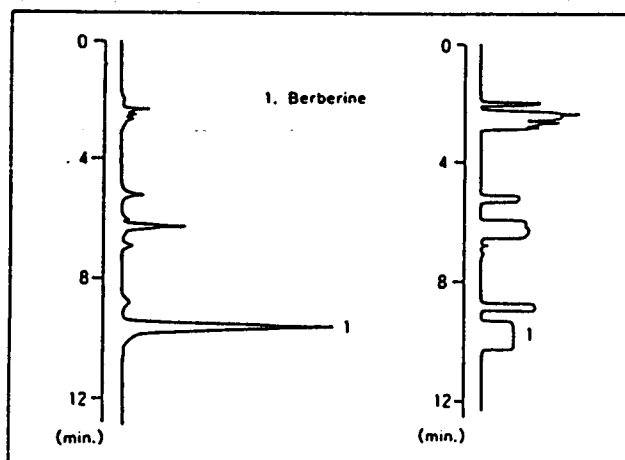


Fig. 4 Chromatogram of Powdered Coptis Rhizome (left) and the Corresponding Ratio-chromatogram (right)

■ Analysis in Wavelength Time Program Mode

This is a program detection of standard mixed samples of antibacterials according to the individual detection wavelength (Fig. 5). By such time program function, the target component can be selectively determined at high sensitivity. Of these analytical conditions, the wavelength time program condition is shown in Table 3, and the separation condition in Table 4.

Table 3 Detector Time Program

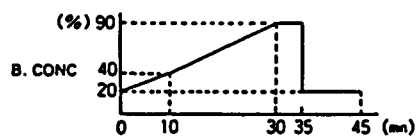
Initial value	WAVE	358(nm)
9.00 (min)	WAVE	268
11.50	WAVE	226
12.80	WAVE	367
13.70	WAVE	268
17.00	WAVE	274
20.00	WAVE	306
26.00	WAVE	271
27.90	WAVE	345

Column : Capcellpak C₁₈SG120 (4.6mm I.D. × 150mm L.)

Mobile Phase : A) 10mM (sodium) phosphate (pH 2.6)

B) Acetonitrile/A = 1/1

A → B gradient elution method



Flow Rate : 1.0mL/min

Temperature : 35°C

Table 4 Analytical Conditions

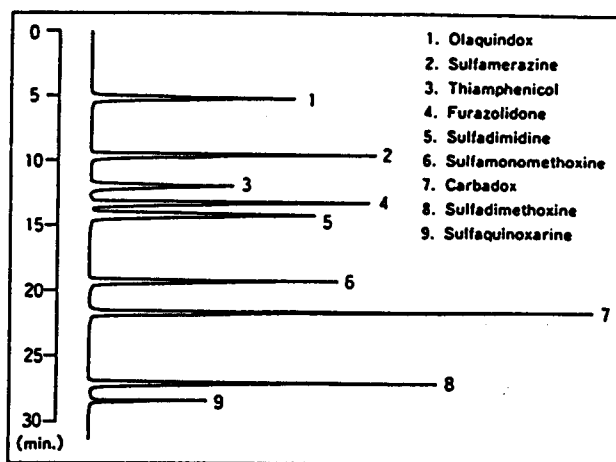


Fig. 5 Chromatogram of Synthetic Antibacterial Standards



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