

## HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

No. 1238

Application of the New Photodiode Array  
UV-VIS Detector SPD-M10A<sub>VP</sub> (No.1)

In the analysis using the HPLC, in order to attain more accurate determination of the target substance by obtaining not only retention time but also spectral information of the target substance in real time, the photodiode array detector is often applied.

The SPD-M10A<sub>VP</sub> photodiode array detector that has newly been put on the market has realized improved functions and performance in a compact body as shown below.

- Noise level :  $\pm 0.8 \times 10^{-5}$  AU (250nm, 600nm)
- Wavelength range : 190nm ~ 800nm
- Wavelength accuracy :  $\pm 1$ nm
- Light source : D<sub>2</sub>, W, D<sub>2</sub>+W lamp (three mode)
- Dimensions : More compact than previous model

Furthermore, this SPD-M10A<sub>VP</sub>, which operates in the environment of the CLASS-LC10/M10A software which enjoys reputation for good operability and a variety of functions, can be used with the same feeling as a single wavelength detector in a wide field of application including food industry, environmental

monitoring field and so on.

Introduced in this article are examples of analyses using the new detector, SPD-M10A<sub>VP</sub>, including a high-sensitivity analysis of thiuram, a pesticide which is often used on golf courses, analysis of benzoic acid and sorbic acid, and analysis of copper chlorophyllin often used as pigment in foods and quasi-drugs.

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### ■ High-sensitivity Analysis of Thiuram

Approximately 100ng/mL concentration of thiuram, a pesticide which is used on golf courses.

Shown below are a chromatogram and a spectrum of thiuram of approximately 100ng/mL in concentration, a pesticide used on golf courses

measured at 272nm. It is comprehended from this that not only a chromatogram but also spectrum of sufficient sensitivity can be obtained even with a concentration of about 100ng/mL.

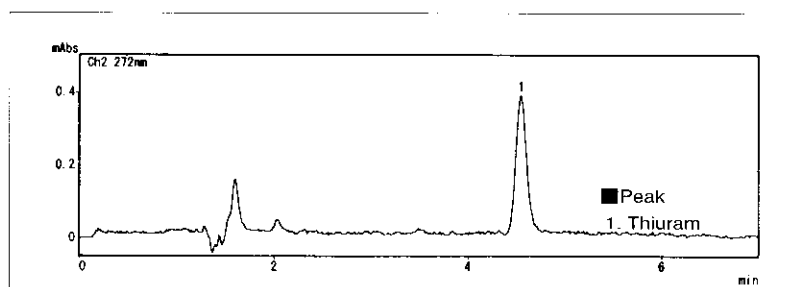


Fig. 1 Chromatogram of Thiuram (c.a. 100ng/mL)

Table 1 Analytical Condition

Column	: STR ODS-II (4.6mm I.D. × 150mmL.)
Mobile Phase	: 10mM sodium phosphate buffer (pH=2.6) / Acetonitrile = 1/1
Flow Rate	: 1.0mL/min
Temperature	: 40°C
Detection	: SPD-M10A <sub>VP</sub> (190nm~350nm)
Injection Volume	: 10 μL

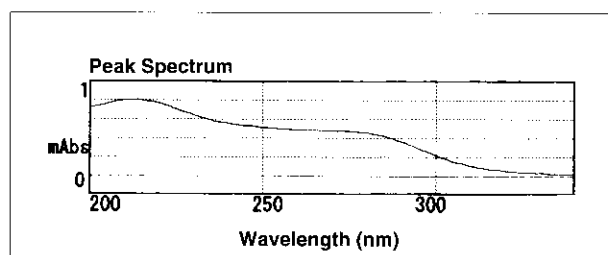


Fig. 2 Spectrum of Thiuram (c.a. 100ng/mL)

## ■ Benzoic Acid and Sorbic Acid

It is considered that in the analysis of foods and medicines, for the purpose of increasing reliability of the determination of the target substance, the photodiode array detector will be used more and more. Shown in Fig.3 through Fig.5 are

chromatograms and spectra of benzoic acid and sorbic acid in a commercial pickle juice. Reliability of the determination of peak components is increased by obtaining the spectrum of each peak.

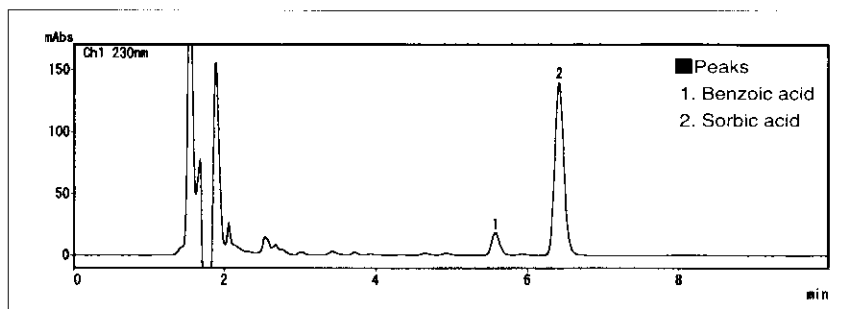


Fig.3 Chromatogram of Benzoic Acid and Sorbic Acid in a Pickle Juice

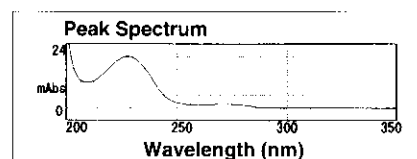


Fig.4 Spectrum of Benzoic Acid in a Sample

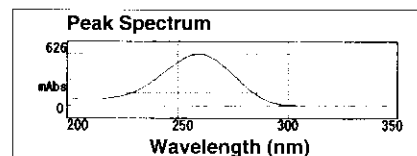


Fig.5 Spectrum of Sorbic Acid in a Sample

Table 2 Analytical Conditions

Column	: STR ODS-II(4.6mm I.D. × 150mmL.)
Mobile Phase	: 5mM sodium citrate buffer (pH=4.0) / Acetonitrile / Methanol = 7 / 2 / 1
Flow Rate	: 1.0mL/min
Temperature	: 40°C
Detection	: SPD-M10Avp (190nm~360nm)
Injection Volume	: 10 μL

## ■ Analysis of Copper Chlorophyllin

Copper chlorophyllin, which is widely used as a pigment for foods, medicines, and quasi-drugs, often contains a lot of impurities having similar structures with each other. For this analysis, spectral information by the SPD-M10AVp is highly efficient. Shown below is an example of analysis of commercially available copper chlorophyllin.

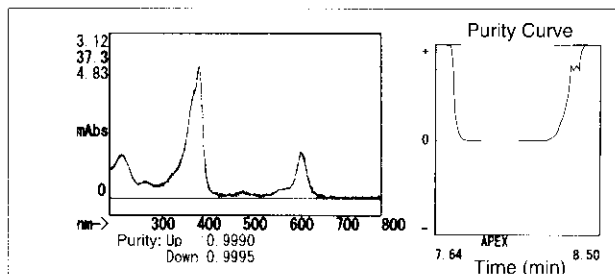


Fig.7 3-point Overlapped Spectra and Peak Purity Curve of Peak No. 1 in a Sample

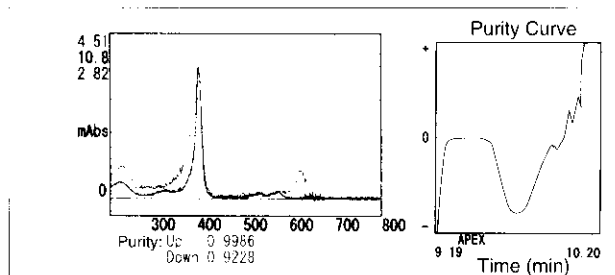


Fig.8 3-point Overlapped Spectra and Peak Purity Curve of Peak No. 2 in a Sample

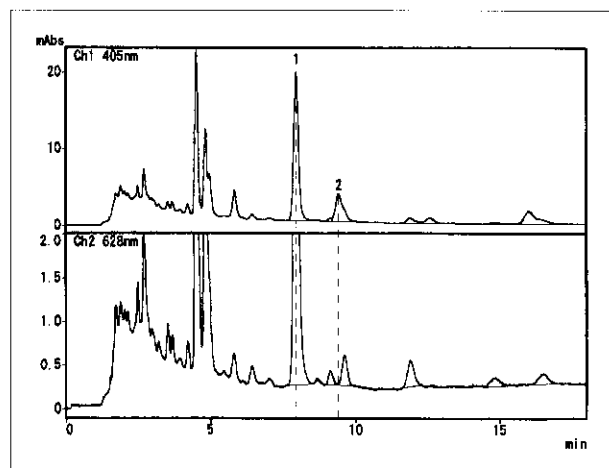


Fig.6 Chromatogram of Sodium Copper Chlorophyllin (405nm, 628nm)

Table 3 Analytical Conditions

Column	: STR ODS-II(4.6mm I.D. × 150mmL.)
Mobile Phase	: 10mM sodium phosphate buffer (pH=2.6) / Acetonitrile = 1 / 5
Flow Rate	: 1.0mL/min
Temperature	: 40°C
Detection	: SPD-M10Avp (190nm~800nm)
Injection Volume	: 10 μL

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