LC 6000

SCION 6000 Series HPLC

For Reliable Performance

SCION INSTRUMENTS

Value Proposition 6000 Series HPLC

- **Outstanding performance**
  - Excellent reproducibility made possible due to the Pump and Autosampler
  - Excellent stability of the column oven and detectors
- **Easy of Use**
  - Simple operation
  - Easy of use
  - Easy maintenance
- **Robustness**
  - High quality materials adopted
  - Strict quality control and standard

LC6000

6000 Series HPLC Modular Line Up

- **Organiser (Solvent Cabinet)**
- **Quaternary Pump**
- **Autosampler**
  - With or w/o Cooling
- **Column Oven**
  - With or w/o Peltier
- **Diode Array Detector**
- **UV Detector**

Scion 6510 Organizer

Scion 64X0 Detectors

Scion 6310 Column oven

Scion 6220 Autosampler

Scion 6100 Pump

LC6000

6510 Organiser / Solvent Cabinet

- **Big capacity for various bottles**
  - 3.785 L (U.S. gallon bottle) x 2 + 500 mL x 2
  - (b) 3.0 L (Japanese gallon bottle) x 2 + 500 mL x 2
  - (c) 2.5 L (Popular in EU) x 2 + 500 mL x 3
  - (d) 1.0 L bottle x 5 + 500 mL x 2

- **Easy to set up bottles**
  - Handle located on the front side of organizer moves vertically for easy to access to solvent bottles

- **Doubling as a power supply module**
  - Organizer supplies power to one pump, one autosampler, one detector, and one interface control board.

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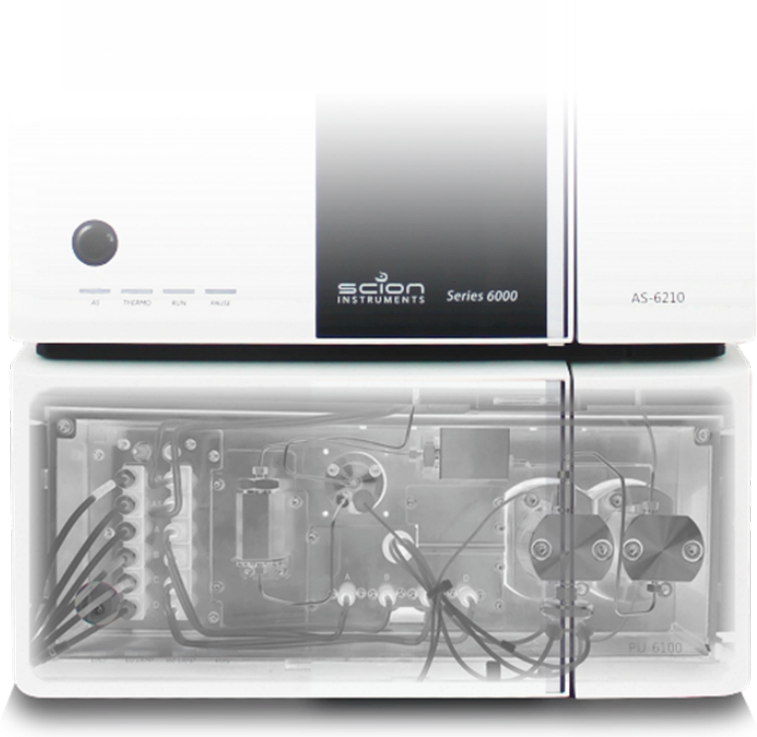
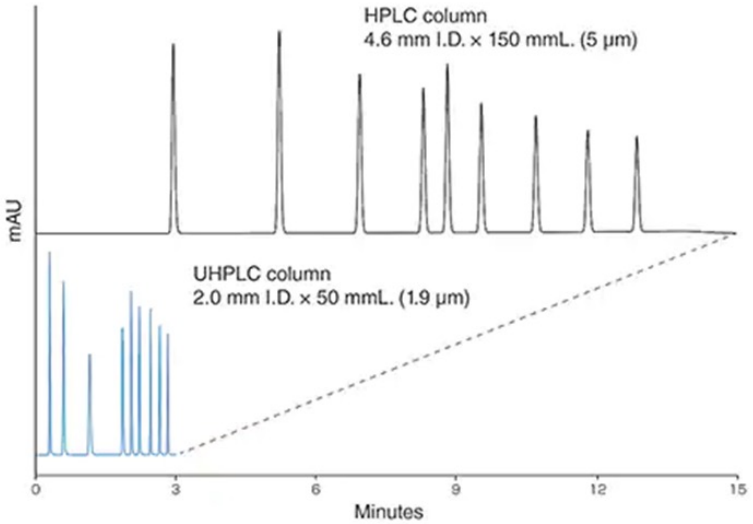
6100 Quaternary Pump



◆ 60 MPa withstand pressure Pump

- ➢ Possible to use HPLC columns with 2.0 μm or smaller particles. also ensures improved resolution performance and shorter analysis time.
- ➢ Applicable for various application together with 60 MPa Autosampler



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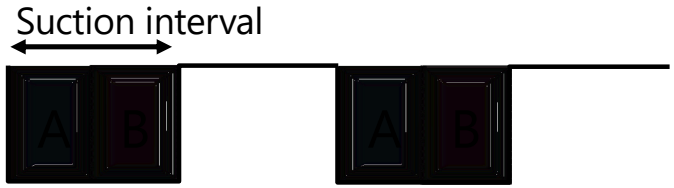
6100 Quaternary Pump

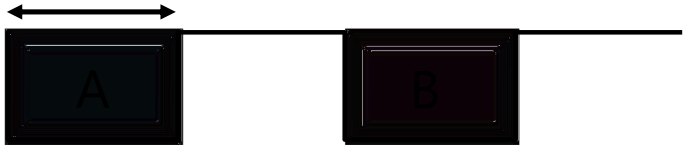
◆ Superior Gradient Performance

➢ Gradient Reproducibility & HFM Mode with double switching proportional valves



High Frequent Mode (HFM)

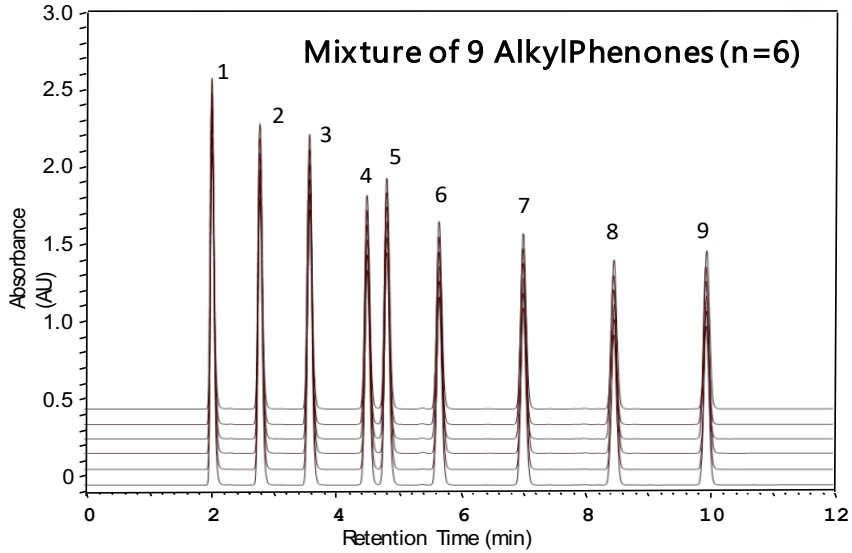
increases the switching frequency of the proportioning valve for improvement in the mixing capacity of the mobile phase.



Low Frequent Mode (LFM)

decreases the switching frequency of the proportioning valve for improvement in the gradient accuracy capacity of the mobile phase.

◆ Superior Reproducibility



Peak No.	Component	Retention time		Area	
		Average (min)	R.S.D. (%)	Average	R.S.D. (%)
1	Acetanilide	2.032	0.0762	5309454	0.29
3	Propiophenone	3.581	0.0958	5537572	0.21
5	Benzophenone	4.809	0.0982	5044686	0.29
7	Hexanophenone	6.975	0.082	4021828	0.24
9	Octanophenone	9.882	0.0775	3667659	0.28

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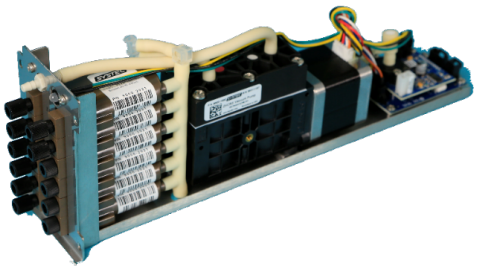
6100 Quaternary Pump

SCION INSTRUMENTS

- **Excellent Flow Rate Precision**
  - High Speed real-time pulse impression to deliver small pulsating flow
- **6 Channel degassing**
  - 4 for solvents and 2 for autosampler
  - Smaller (480 µl/channel) degassing channel tube used
  - Rapid solvent switch



- **Standard Plunger Wash Pump**
  - To reduce salt deposition
  - Washing is possible after each analysis
- **Optional Dynamic Mixers**
- **Automatic Purging**

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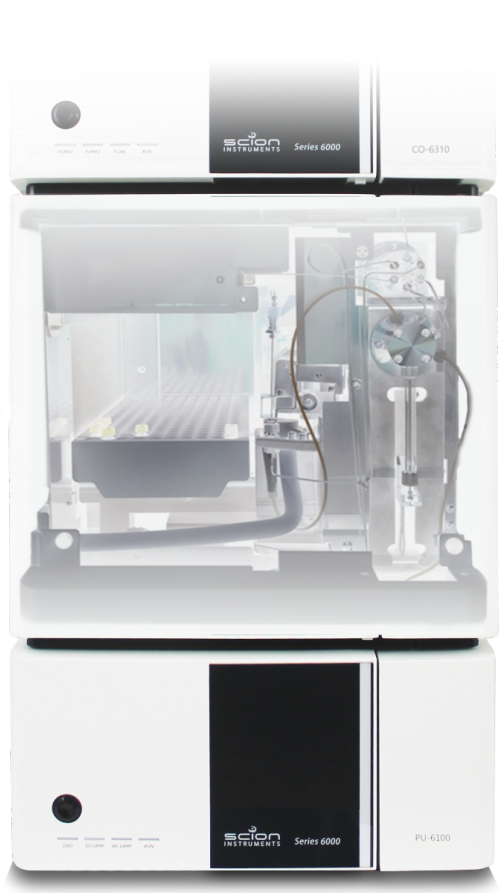
6210/6220 Autosampler



- **Direct Injection Architecture**
  - Allows tiny volume of sample to be injected without any loss
  - Sample needle is assembled in analytical flow path
  - Suitable for trace sample measurement
- **60 MPa High Pressure Tolerance**
  - Allows the use of column with 2 μm or less particle size, which improve separation performance and reduce analysis time
- **GLP and GMP Function**
  - Number of operations and replacement storable as maintenance Logbook
- **Misoperation Detection Functions**
  - Vial detection function and Liquid leakage sensor

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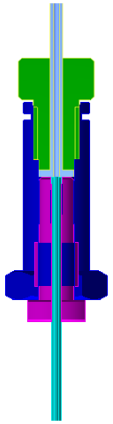
6210/6220 Autosampler

◆ High Accuracy Analysis

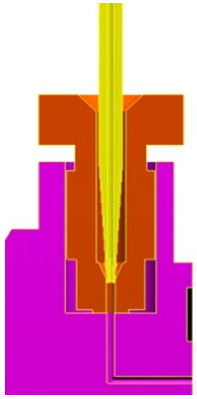
- ➢ Synchronizing timing of sample injection and with operation of liquid transport system

◆ Ultra Low Carry Over <0.003%

- ➢ Improved structure of needle connection
- ➢ Direct linkage of injection port and valve



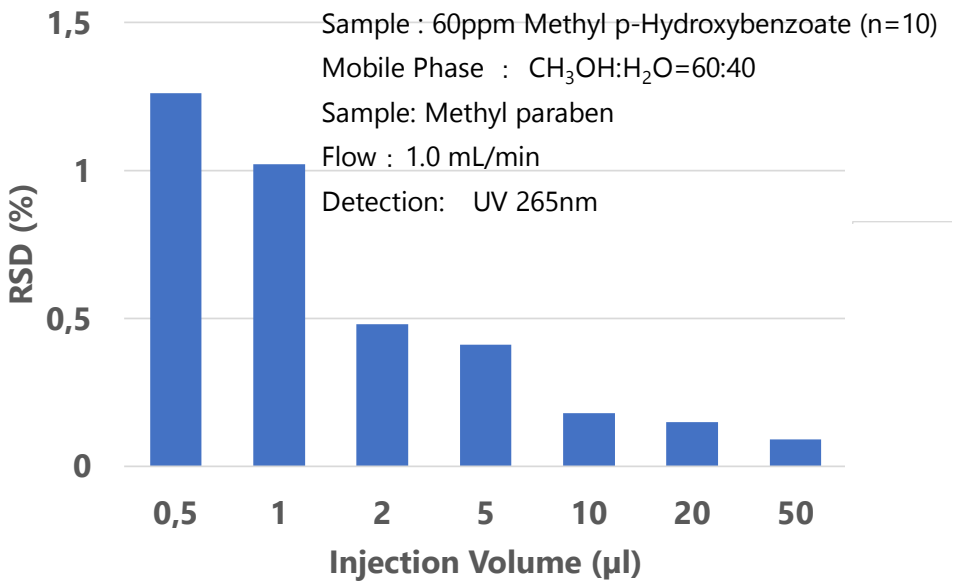
Flange needle



Injection port

◆ Excellent Injection Volume Precision

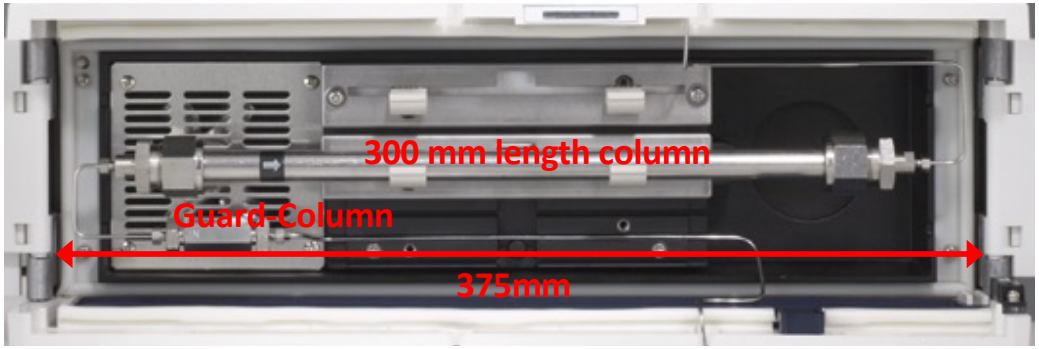
- ➢ Through adoption of High-Precision Syringe drive unit



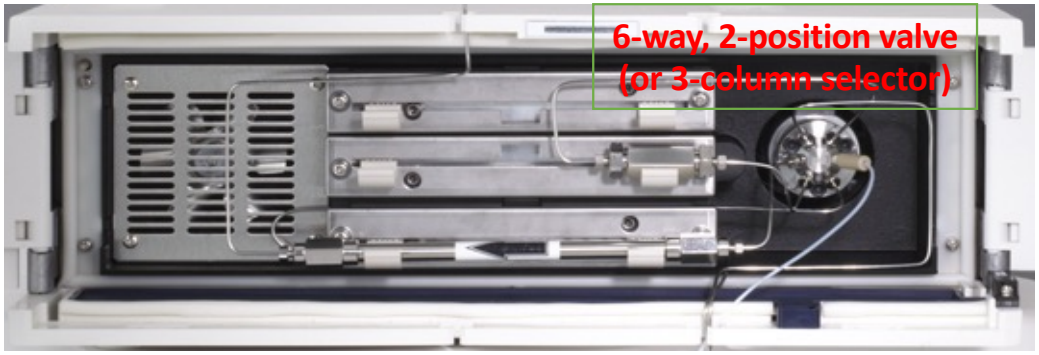
6310/6320 Column Oven

◆ High Capacity

- ➢ Accommodate 3x columns in 300mm length



◆ Column Select Valve (Optional)



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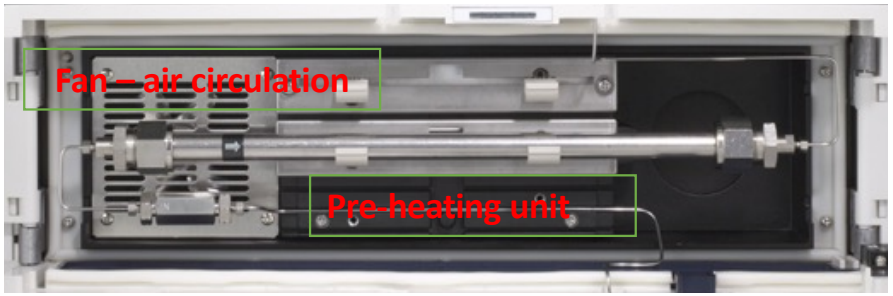
6310/6320 Column Oven

◆ Excellent Wide Temperature Control

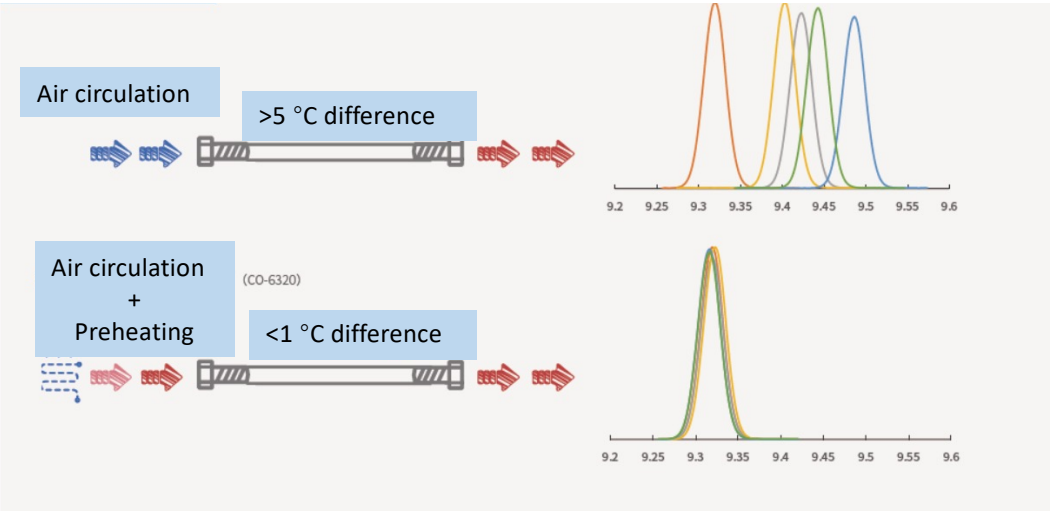
- ➢ Block-type pre-heating based on Peltier heating and cooling control
- ➢ Wide temperature range - 1 – 85 °C
- ➢ High temperature precision - SD 0.2 °C



◆ Column Select Valve (Optional)

◆ Improved Data Repeatability by Preheating

- ➢ The preheat system (FACTS: Flow Adapted Column Temperature Stability) is loaded
- ➢ Pead spread reduce when ambient temperature changed



LC6000

Family of Detectors

UV

FLD

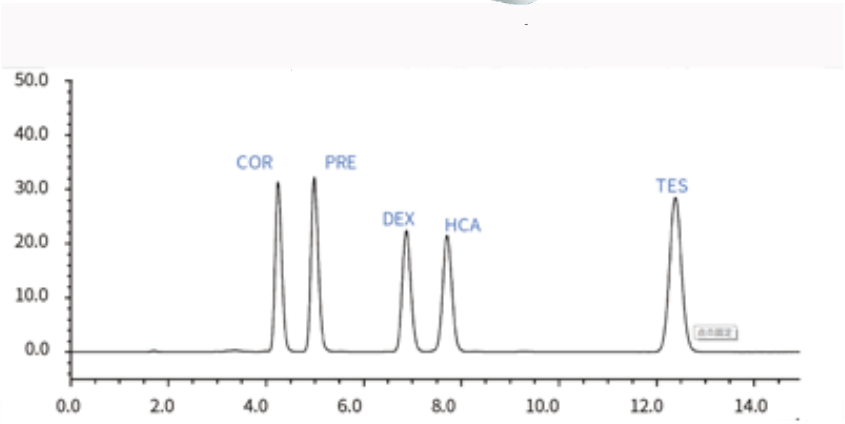
DAD

ELSD

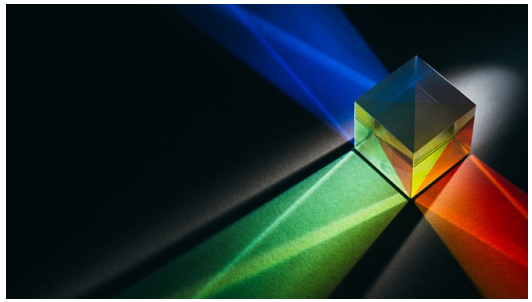
RI

LC6000

6410 UV Detector



- **High Sensitivity and Stability**
  - By suppressing noise and drift
- **High Wavelength Accuracy**
  - Built in Hg lamp for UV region check
- **Dual-wavelength Measurement**
  - Adopting a new gear drive system
  - High data acquisition interval (400/800ms)
- **Thermostat controlled flow cell**
- **Wide range 190 nm to 600 nm**



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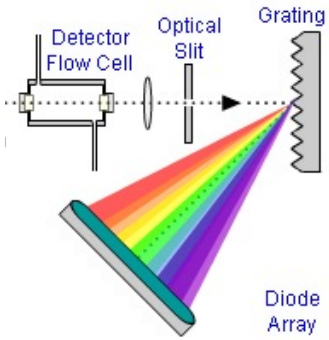
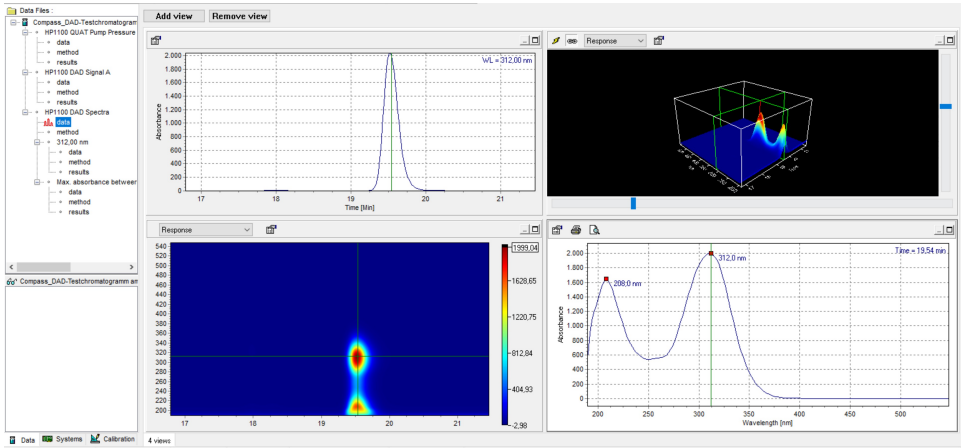
6430 Diode Array Detector





- **High Qualitative Performance**
  - 1024-bit diode array adopted (Wavelength resolution: 0.78 mm/channel)
  - Broad wavelength (190-900nm)
- **High Sensitivity- Low Noise & Drift**
  - Reduced influence of optical ambient temperature change
  - Adoption of a variable air volume fan with a temperature sensor and the special cover
- **Shorter Stabilization Time**
  - 30% less
- **Reference Chromatogram Substraction**
  - Applicable to fixed quantity calculation

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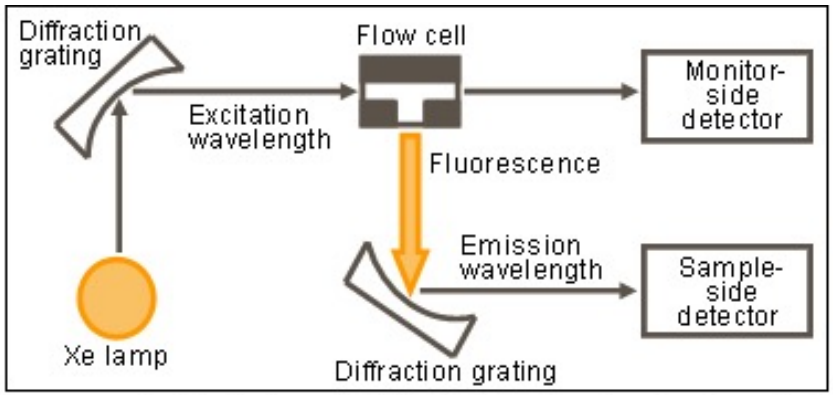
64400 FL Detector



- **High Sensitivity**
  - Bright optical system adopted
  - >3000 (RMS)
- **Long life-time Xenon Lamp**
  - >2000 hrs
  - Automatic wavelength accuracy calibration with built-in Hg lamp
- **Emission Slit – 15/30nm selectable**
  - To maximize sensitivity

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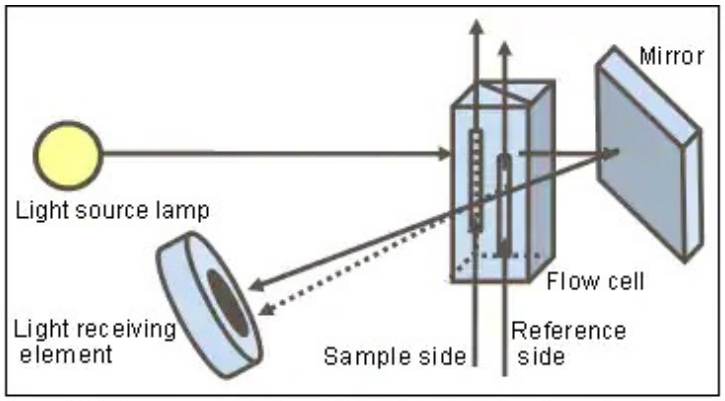
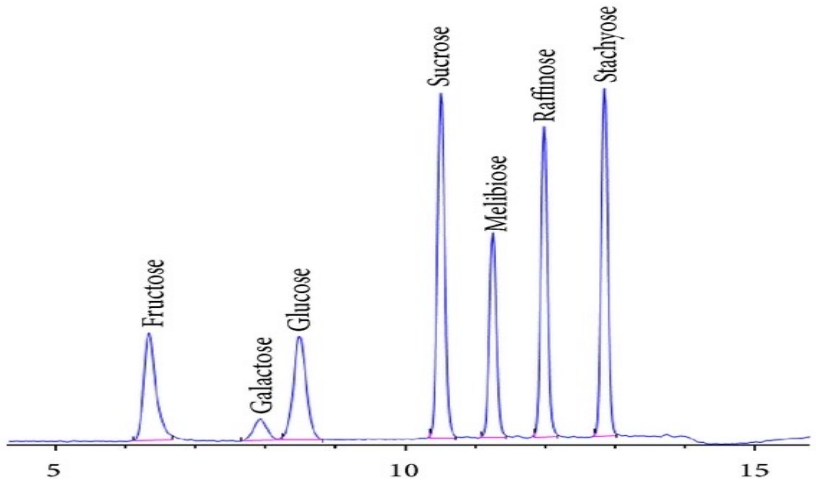
6450 RI Detector



- **Shorten Stabilization Time**
  - Within 1 hr owning to the optimization of temperature control system
- **Variable Cell Tempeature**
  - 30-50°C (1 °C step)
- **Emission Slit – 15/30nm selectable**
  - To maximize sensitivity



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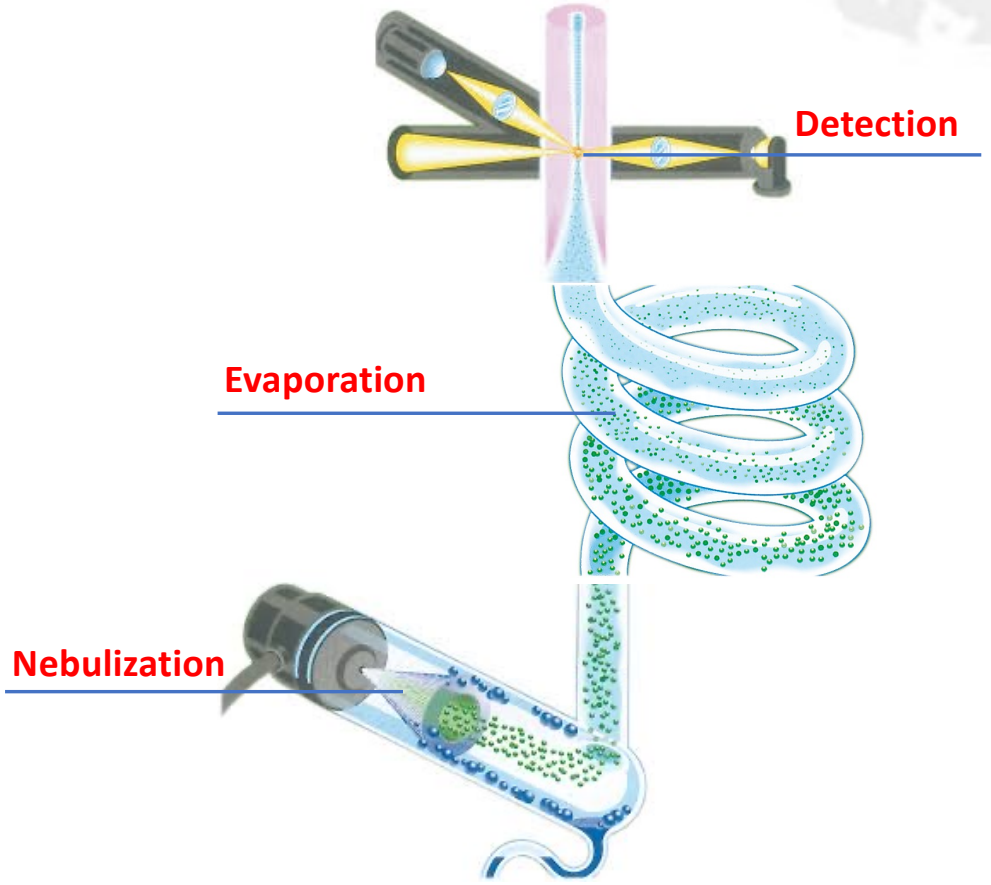
6460 ELSD Detector

- **Universal Detector**
  - Applicable to UV and non-UV absorbing compounds
- **Shorten Stabilization Time**
  - Within 1 hr owning to the optimization of temperature control system
- **Variable Cell Temperature**
  - 30-50°C (1 °C step)



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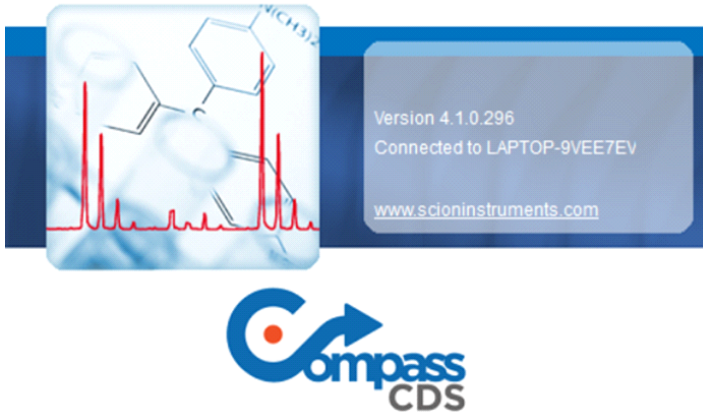
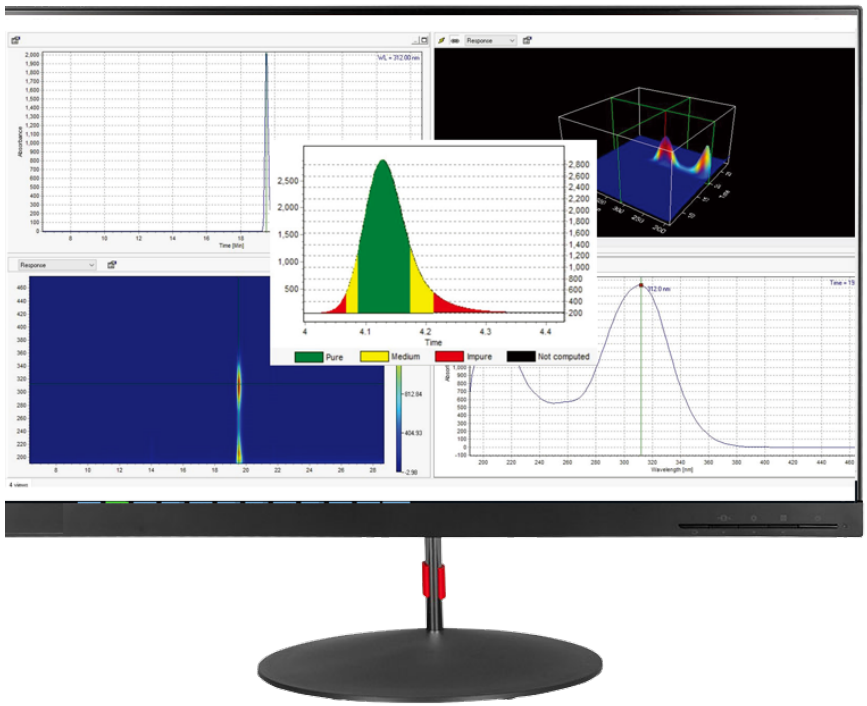
CompassCDS with 6000 Series HPLC

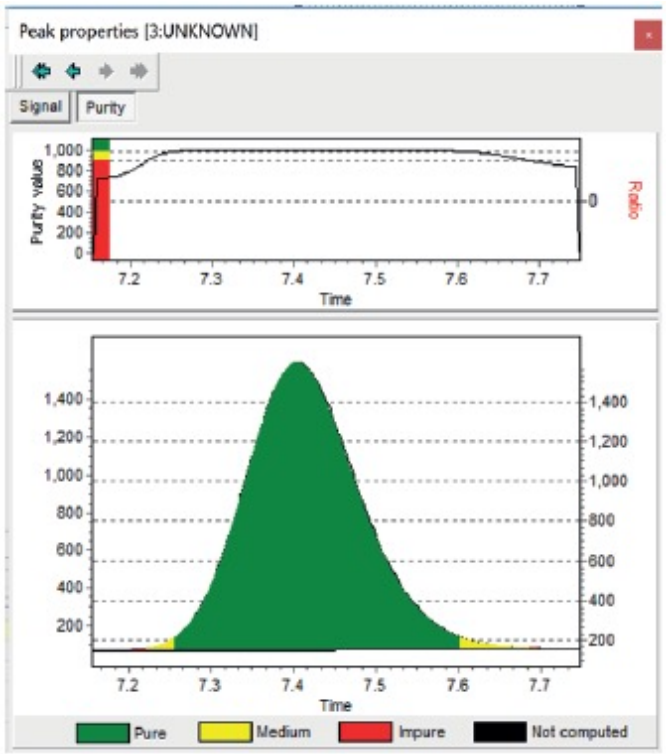
- **Control of all 6000 Series Modules**
- **Powerful Integration, Calibration and Reporting Tools**
- **21 CFR 11 Compliance**
- **IQ/OQ/PQ**



CompassCDS with 6000 Series

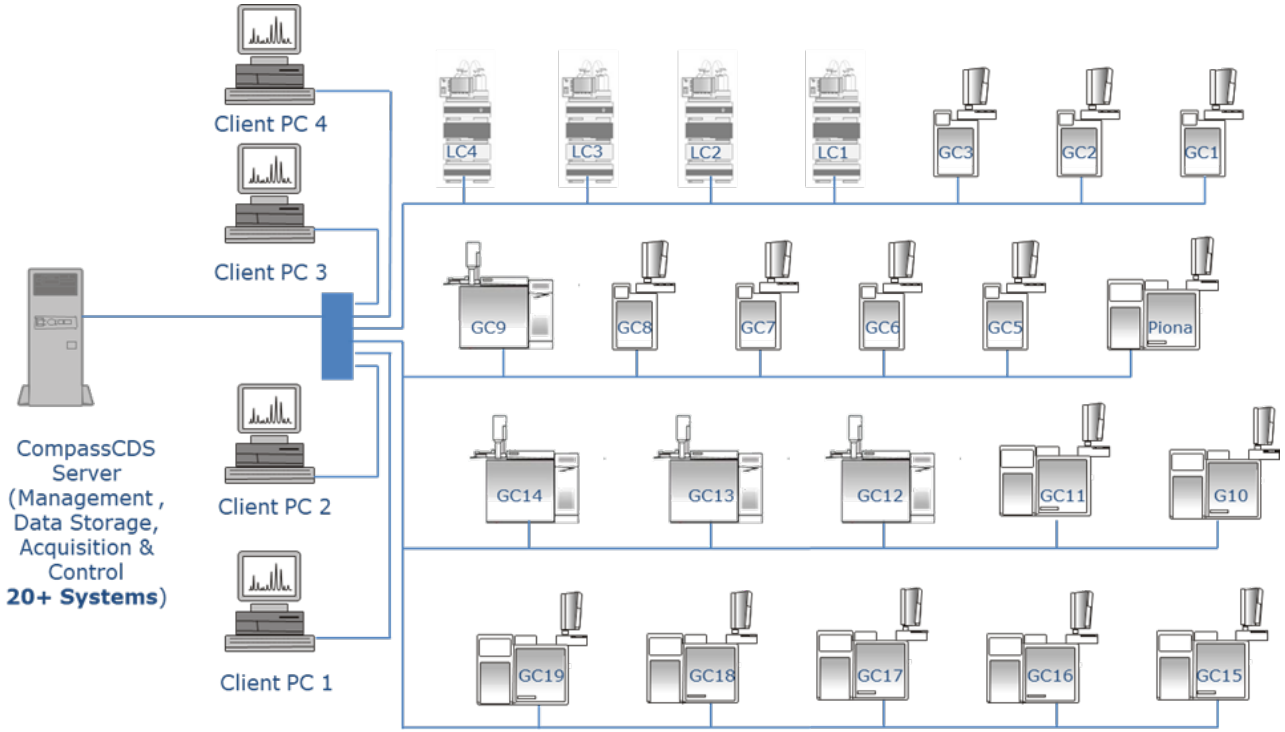
➢ 3D Data view for DAD



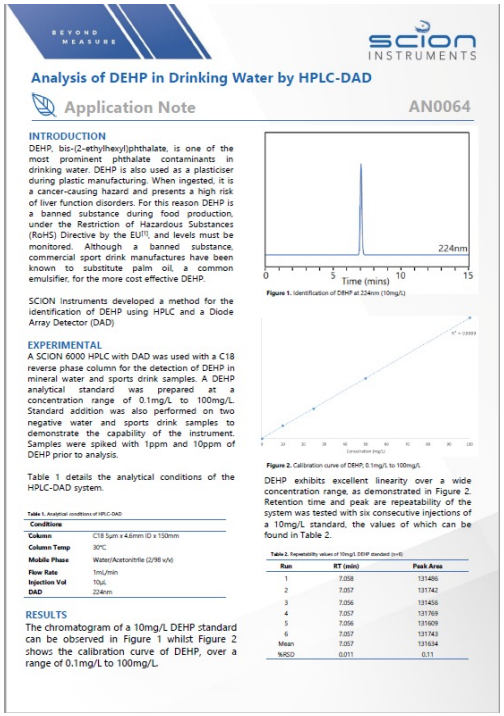


CompassCDS with 6000 Series

- **Fully Scalable - Client Server or Standalone**



Applications



Analysis of DEHP in Drinking Water by HPLC-DAD

Application Note AN0064

INTRODUCTION

DEHP, bis-(2-ethylhexyl)phthalate, is one of the most prominent phthalate contaminants in drinking water. DEHP is also used as a plasticiser during plastic manufacturing. When ingested, it is a cancer-causing hazard and presents a high risk of liver function disorders. For this reason DEHP is a banned substance during food production, under the Restriction of Hazardous Substances (RoHS) Directive by the EU[1], and levels must be monitored. Although a banned substance, commercial sport drink manufactures have been known to substitute palm oil, a common emulsifier, for the more cost effective DEHP.

SCION Instruments developed a method for the identification of DEHP using HPLC and a Diode Array Detector (DAD)

EXPERIMENTAL

A SCION 6000 HPLC with DAD was used with a C18 reverse phase column for the detection of DEHP in mineral water and sports drink samples. A DEHP analytical standard was prepared at a concentration range of 0.1mg/L to 100mg/L. Standard addition was also performed on two negative water and sports drink samples to demonstrate the capability of the instrument. Samples were spiked with 1ppm and 10ppm of DEHP prior to analysis.

Table 1 details the analytical conditions of the HPLC-DAD system.

Conditions	
Column	C18 5µm x 4.6mm ID x 150mm
Column Temp	30°C
Mobile Phase	Water/Acetonitrile (2/98 v/v)
Flow Rate	1mL/min
Injection Vol	10µL
DAD	224nm

RESULTS

The chromatogram of a 10mg/L DEHP standard can be observed in Figure 1 whilst Figure 2 shows the calibration curve of DEHP, over a range of 0.1mg/L to 100mg/L.

Figure 1. Identification of DEHP at 224nm (10mg/L)

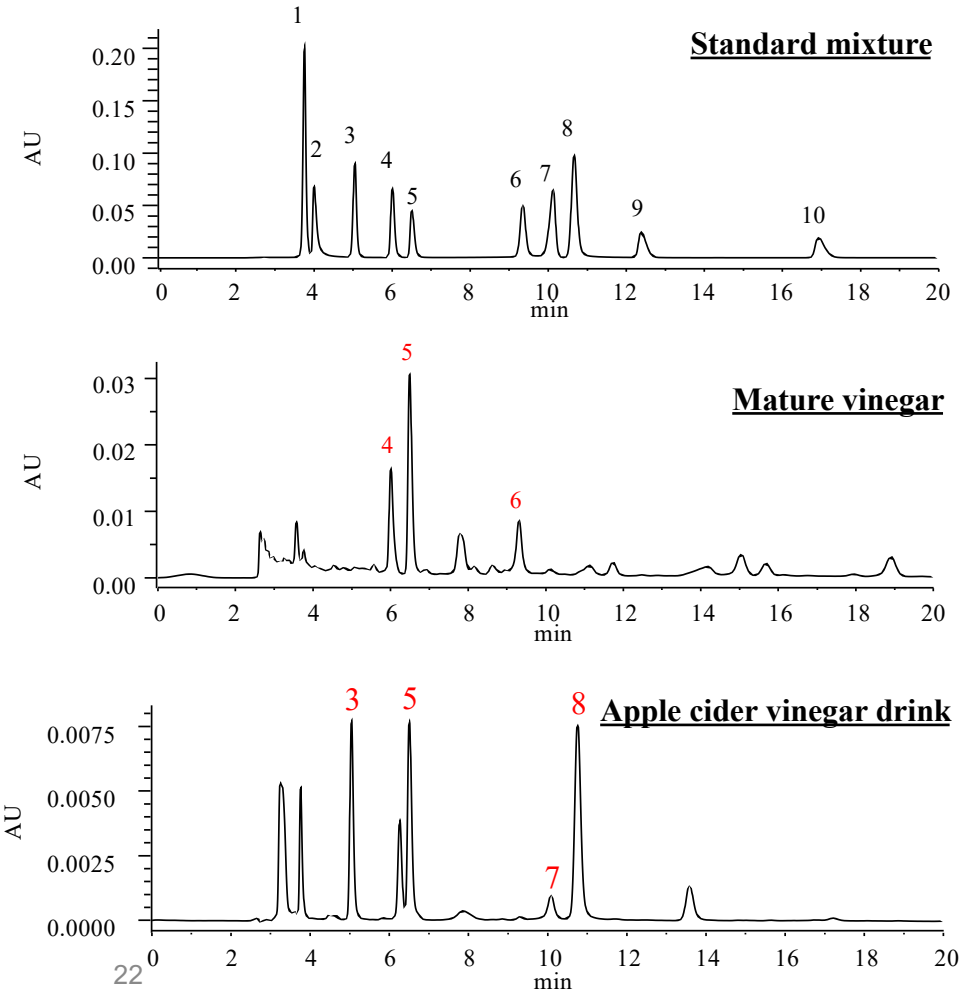
Figure 2. Calibration curve of DEHP, 0.1mg/L to 100mg/L

DEHP exhibits excellent linearity over a wide concentration range, as demonstrated in Figure 2. Retention time and peak are repeatability of the system was tested with six consecutive injections of a 10mg/L standard, the values of which can be found in Table 2.

Run	RT (min)	Peak Area
1	7.058	131486
2	7.057	131742
3	7.056	131456
4	7.057	131769
5	7.056	131609
6	7.057	131743
Mean	7.057	131634
%RSD	0.011	0.11

- AN060 Water-Soluble Vitamins
- AN061 Fat-Soluble Vitamins
- AN062 Analysis of 2,4-DNPH Derivatised Aldehydes
- AN063 Analysis of Catechins
- AN064 Analysis of DEHP in Drinking Water
- AN065 Simultaneous Analysis of Food Dyes
- AN066 High Sensitivity Analysis of Organic Acids
- AN067 Analysis of Glycosides in Medicines
- AN068 Simultaneous Analysis of Phenoxyethanol and Parabens

Analysis of Organic Acids using UV Detection

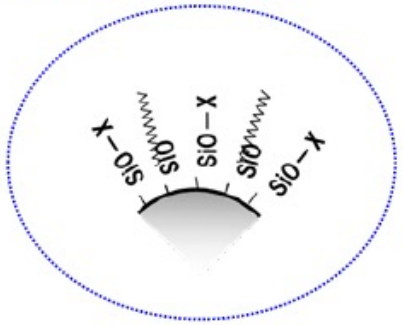


1. Tartaric acid
2. Formic acid
3. Malic acid
4. Lactic acid
5. Acetic acid
6. Pyroglutamic acid
7. Citric acid
8. Fumaric acid
9. Succinic acid
10. Propionic acid

[Analytical conditions]

Column	:	LaChrom C18-AQ (5 μm) 4.6 mm I.D. × 250 mm
Eluent (pH 2.8)	:	1 mmol/L H_2SO_4 + 8 mmol/L Na_2SO_4
Flow rate	:	1.0 mL/min
Column temp.	:	25 ℃
Detection	:	UV 210 nm
Injection vol.	:	10 μL

"LaChrom C18-AQ" column



Carbon content : 12 %

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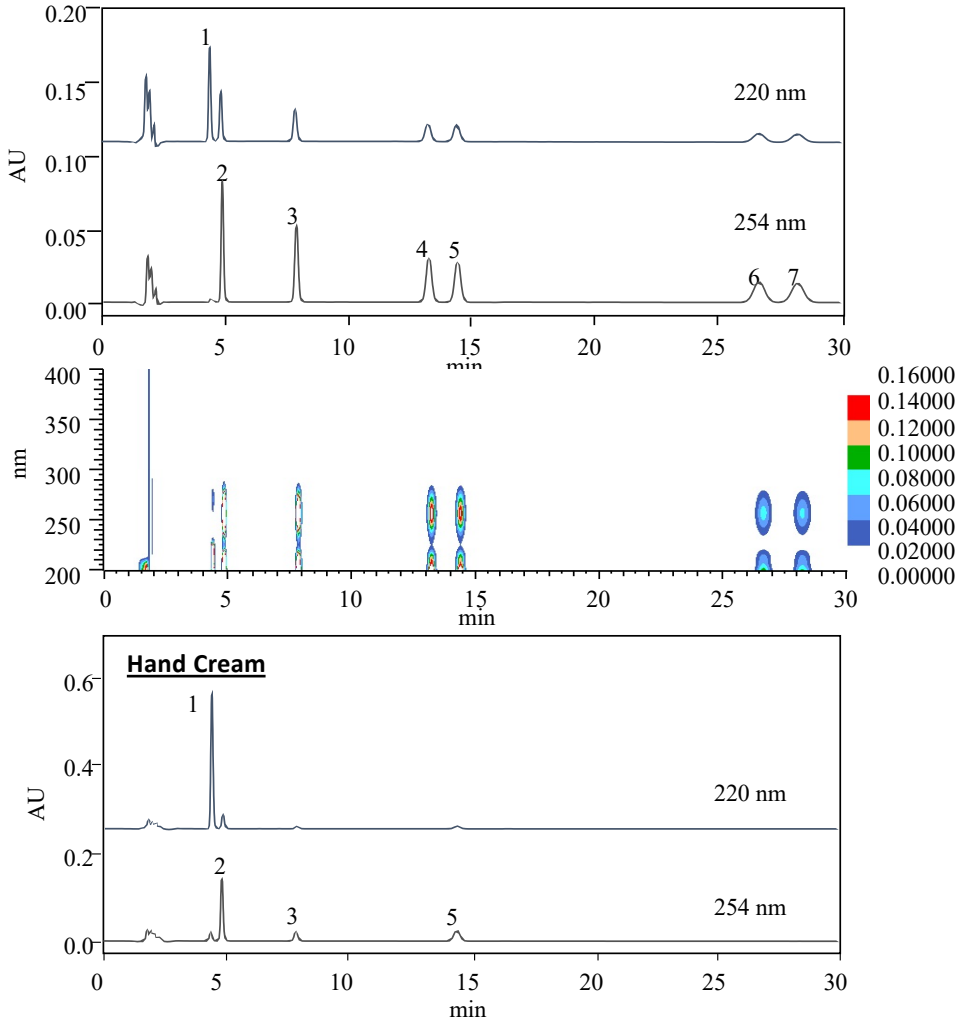
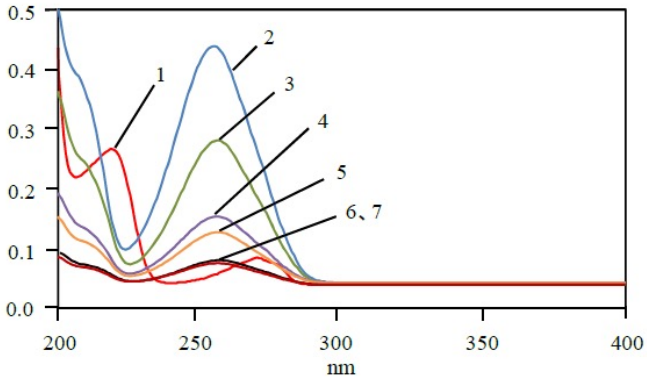
Simultaneous Analysis of Phenoxyethanol & Parabens

SCION INSTRUMENTS



[Standard Samples]

(1) 2-Phenoxyethanol
(2) Methyl *p*-hydroxybenzoate
(3) Ethyl *p*-hydroxybenzoate
(4) Isopropyl *p*-hydroxybenzoate
(5) Propyl *p*-hydroxybenzoate
(6) Isobutyl *p*-hydroxybenzoate
(7) Butyl *p*-hydroxybenzoate



[Analytical conditions]

Column	:	LaChrom C18 (5 µm) 4.6 mm I.D. × 150 mm
Eluent	:	CH_3CN / 0.1 % H_3PO_4* (v/v) = 35 / 65 (v/v)
Flow rate	:	1.0 mL/min
Column temp.	:	40 °C
Detection	:	DAD 220, 254 nm
Injection vol.	:	10 µL

* : H_3PO_4 is of a special grade (85.0 %)

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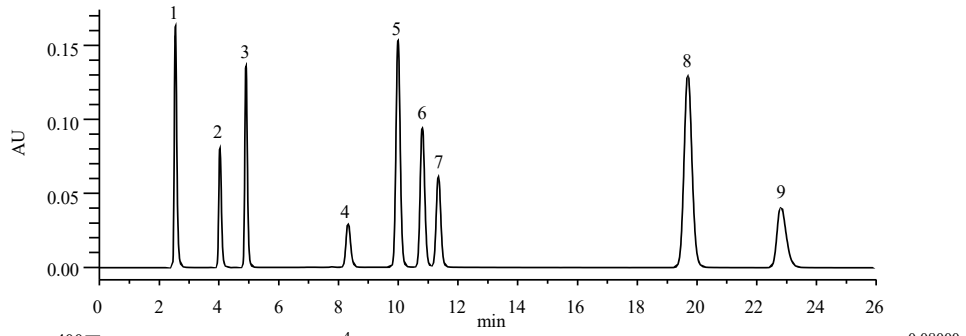
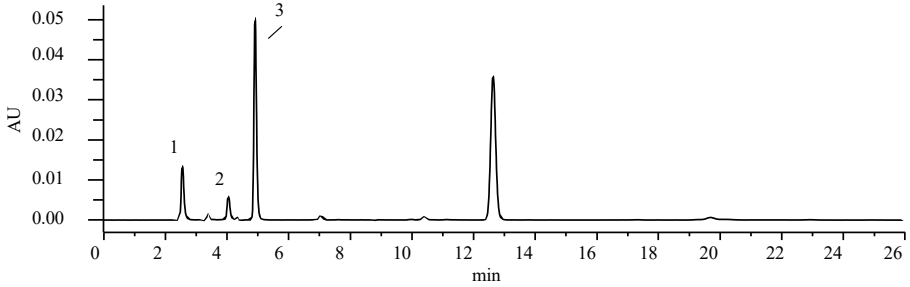
Simultaneous analysis of water-soluble vitamins

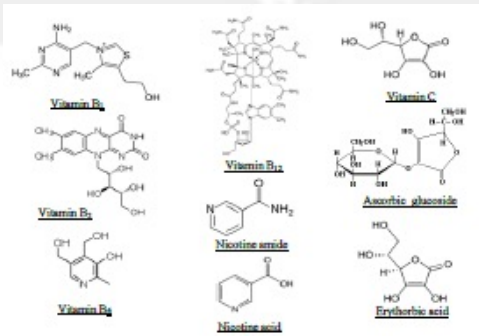


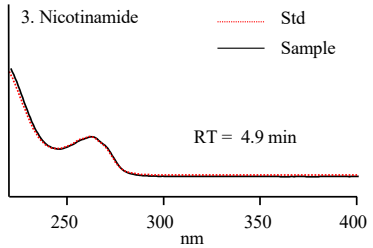
Health Drink Sample



Component
1. Vitamin B_1 (thiamine) *
2. Vitamin B_6 (pyridoxine) *
3. Nicotinamide
4. Vitamin B_{12} (cyanocobalamin)
5. Ascorbic glucoside
6. Vitamin C (ascorbic acid)
7. Erythorbic acid
8. Vitamin B_2 (riboflavin)
9. Nicotine acid

(*) hydrochloride salt used.
Concentration of 50 mg/L for each.
Standard stock / standard solution diluted using eluent.



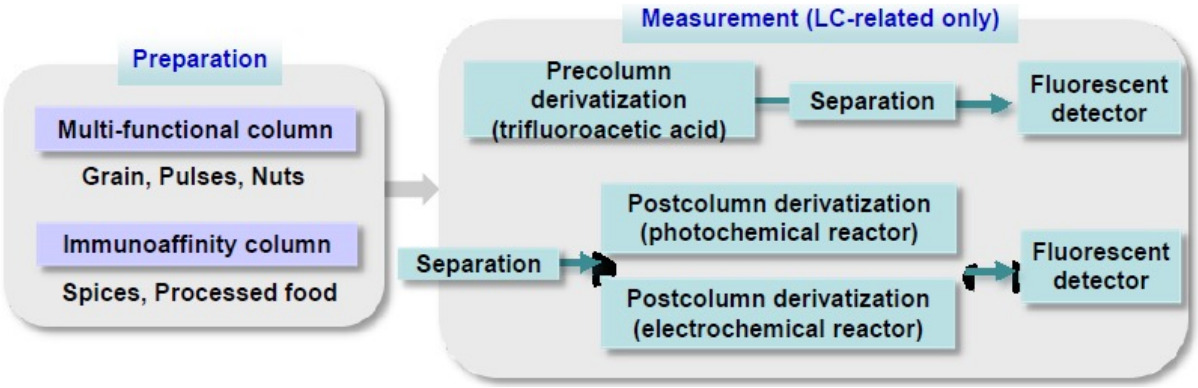


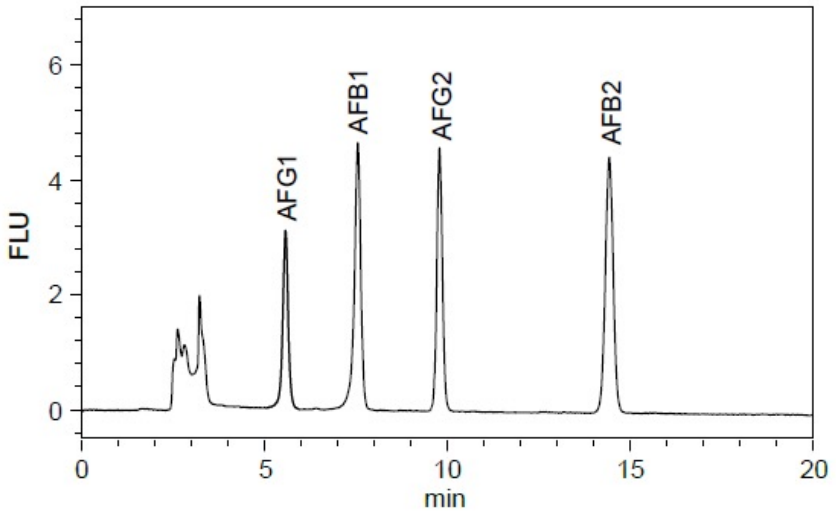
[Analytical conditions]

Column	:	LaChrom C18 (5 µm) 4.6 mm I.D. × 250 mm
Eluent	:	Phosphate buffer, pH 5.2*/ CH_3CN = 90 / 10 (v/v) *consists of 10 mM tetrbutylammonium hydroxide and 10 mM KH_2PO_4, adjusted the pH using H_2PO_4
Flow rate	:	0.8 mL/min
Column temp.	:	40 °C
Detection	:	DAD 260 nm
Injection vol.	:	10 µL

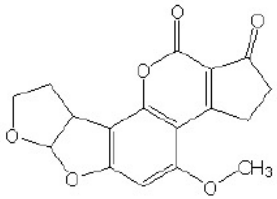
LC6000

Analysis of Aflatoxin in food by HPLC-FL

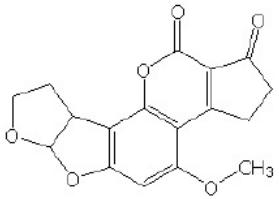




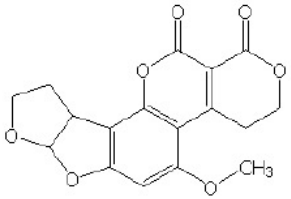
[Measurement of standard samples (0.5 ng/mL (1.0 µg/kg) each]



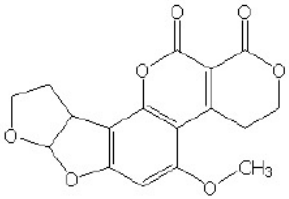
Aflatoxin B1
$C_{17}H_{12}O_6$ = 312.27



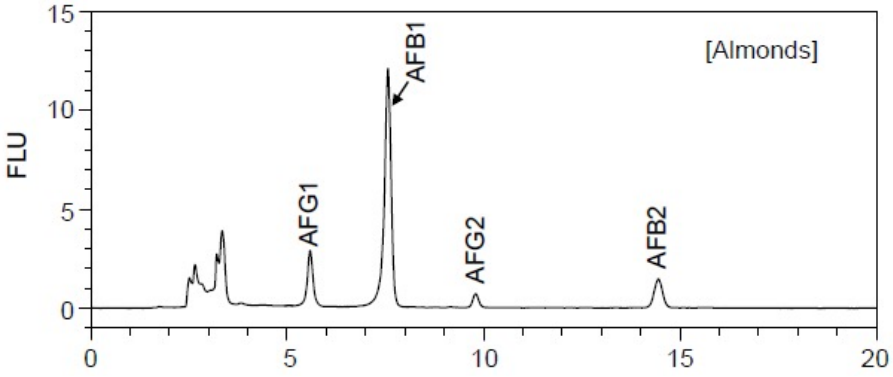
Aflatoxin B2
$C_{17}H_{14}O_6$ = 314.29



Aflatoxin G1
$C_{17}H_{12}O_7$ = 328.27



Aflatoxin G2
$C_{17}H_{14}O_7$ = 330.29



LC 6000

For Today and Tomorrow

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