

Analysis of UV Absorbers in Sunscreen Using the Hitachi LaChrom Elite® HPLC System with Diode Array Detection

Sunscreens typically contain a mixture of UV absorbing components designed to provide protection from a range of ultraviolet wavelengths. Some of the active ingredients found in sunscreens are also thought to be hazardous to human health. As such, it is beneficial to know both the concentration of the active ingredients in sunscreens, as well as the wavelength range that these ingredients protect against. These analyses can be conducted simultaneously by using HPLC with diode array detection. Here we describe the analysis of sunscreen (both the concentration and spectral properties of each analyte) using the Hitachi LaChrom Elite® HPLC system with diode array detection. Specifically, this data represents the analysis of sunscreen components within 20 minutes.¹

Experimental Conditions

Module	Conditions
Pump (L-2130)	Mobile Phase A: 0.2% formic acid in H ₂ O Mobile Phase B: CH ₃ CN Gradient: 65-80% B in 20 minutes Flow Rate: 1.0 mL/min
Autosampler (L-2200)	Injection Volume: 2 µL
Oven (L-2300)	Temperature: 40 °C
Detector (L-2455)	DAD, 220-450 nm, Extracted λ: 304 nm
Column	Hitachi LaChrom C18, 5µm, 4.6 x 150 mm

Standard Components

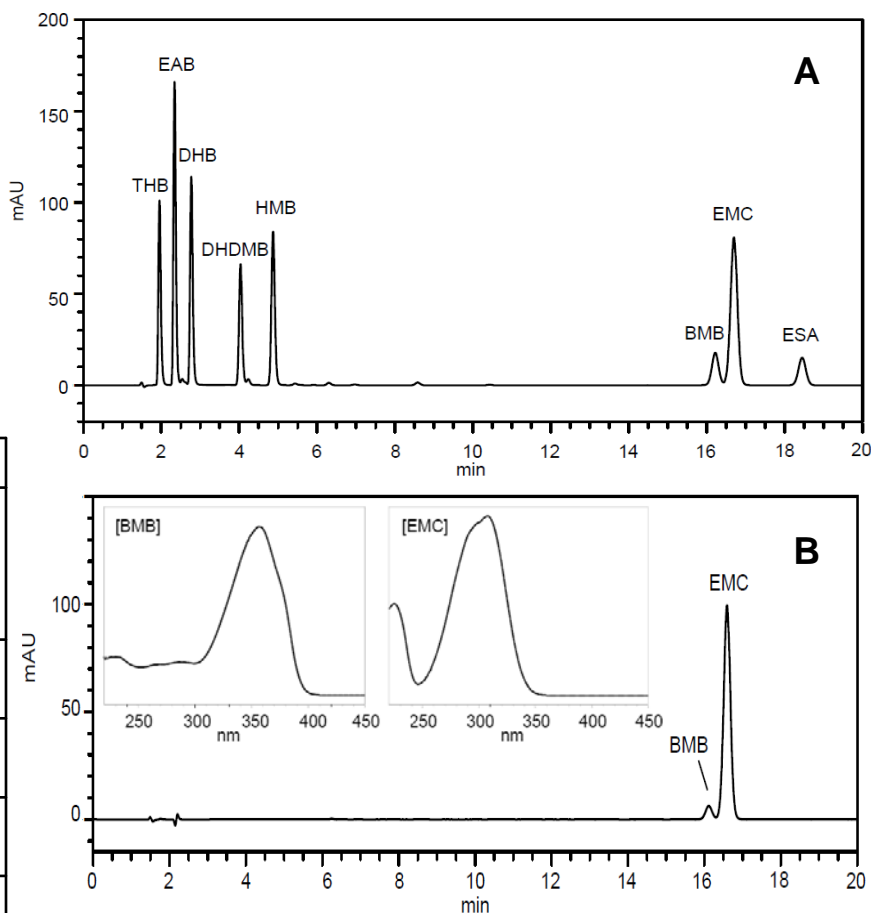
Component	Abbrev.
2,2'-4,4'-Tetrahydroxybenzophenone	THB
Ethyl-p-aminobenzoate	EAB
2,4-Dihydroxybenzophenone	DHB
2,2'-Dihydroxy-4,4'-dimethoxybenzophenone	DHDMB
2-Hydroxy-4-methoxybenzophenone	HMB
Butyl methoxydibenzoylmethane	BMB
2-Ethylhexyl-p-methoxycinnamate	EMC
2-Ethylhexyl salicylate	ESA

Reference:

1 – Technical Data LC-100028, Hitachi High Technologies Corporation.

* LaChromElite is a registered trademark of Hitachi High Technologies America.

Results– A) Extracted Chromatograph of Standards (100 mg/L),
B) Extracted Chromatograph of Sunscreen and Spectra of Peaks



Results- Reproducibility and Linearity

Retention Time Reproducibility (N=6)	RSD = 0.02-0.07%
Peak Area Reproducibility (N=6)	RSD = 0.7-0.9%
Linearity (1-200 mg/L, N=6)	R ² = 0.9993-0.9999

Discussion

Hitachi's LaChrom Elite® liquid chromatography system with diode array detection is extremely effective at analysis of sunscreen active ingredients in under 20 minutes.

Hitachi High Technologies America, Inc.

Life Sciences Division
 5100 Franklin Drive
 Pleasanton, CA 94588
 Toll Free: (800) 548-9001