

Analysis of Phytosterols in Pistachios Using the Chromaster HPLC System with Evaporative Light Scattering Detection

Phytosterols comprise a class of steroids that are structurally similar to cholesterol. They are found in vegetable oils, nuts, and fruits, and are thought to lower cholesterol levels in the blood, which makes phytosterols an attractive diet-based option for treating cardiovascular disease. Although research remains inconclusive regarding the effect of phytosterols on cardiovascular disease, they continue to be of interest due to their proven cholesterol-lowering ability. Presented here is a method for analysis of several phytosterols in pistachios using HPLC with evaporative light scattering detection.

Experimental Conditions

Module	Conditions
Pump (5110)	Mobile Phase A: 70/30 CH ₃ CN/H ₂ O, 0.1% TFA Mobile Phase B: 50/50 CH ₃ CN/acetone, 0.1% TFA Flow Rate: 1 mL/min
Autosampler (5210)	Injection Volume: 25 µL
Oven (5310)	Temperature: 30 °C
Detector (SofTA 1300)	Spray Chamber Temperature: 30 °C Drift Tube Temperature: 60 °C
Column	Eclipse XDB C8, 5 µm, 4.6 x 150 mm

Results: Reproducibility and Linearity

	Peak Area Reproducibility	Linearity (5 µM – 50 µM)
	RSD (%), N = 10	R ²
Cholesterol	2.9	0.9905
Campesterol	4.4	0.9978
Stigmasterol	7.2	0.9995
β-Sitosterol	6.1	0.9986
Stigmastanol	6.9	0.9971

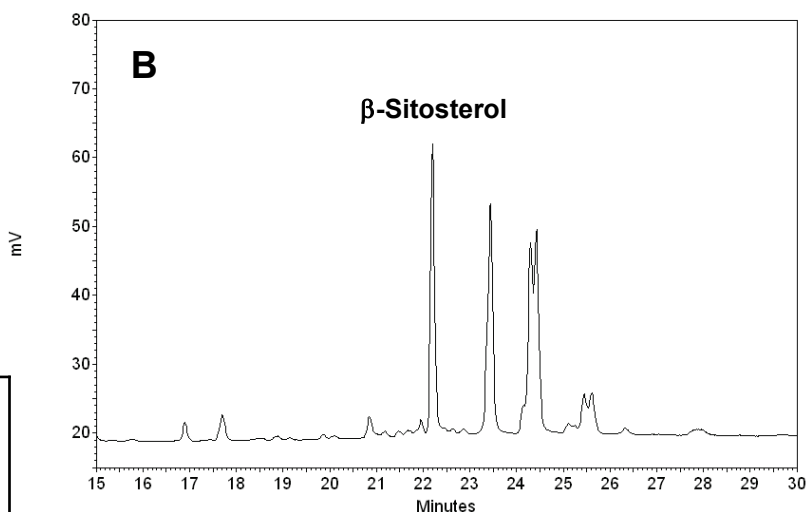
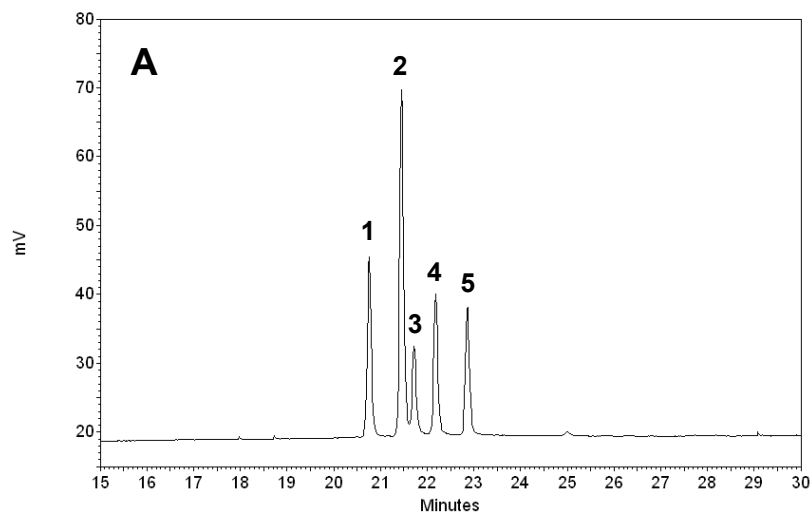
Results: Limit of Detection

S/N ≥ 3 at 17 pmoles for each phytosterol

Results – Chromatographs

A. 5 Component Phytosterol Standard: 50 µM each 1) cholesterol, 2) campesterol, 3) stigmasterol, 4) β-Sitosterol, 5) stigmastanol

B. Pistachio Extract



Discussion

Hitachi's Chromaster liquid chromatography system with ELSD effectively analyzes phytosterols in plant materials. This method exhibits good linearity of response, reproducibility, and sensitivity. The amount of several phytosterols in many types of plant materials can be analyzed within 30 minutes.

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