



High Speed Analysis of Piperine in Pepper using UHPLC

Introduction

Piperine is a particular spicy constituent that is contained in Piperaceae plants and is effective in improving energy metabolism, circulation of the blood and excessive sensitivity to cold.

It is also known that piperine has an antibacterial action, an antiseptic action and an insecticidal action, and it is contained more in black pepper. In this application, piperine in pepper was analyzed using Ultra High-performance Liquid Chromatography with Photodiode Array Detection.



Keywords: Keyword : UHPLC, Pepper, Piperine, 1.8 mm, C18 Column, PDA detector, Supercritical Fluid Extraction

Experimental

Equipment

Pump:	PU-2080
Degasser:	DG-2080-53
Column Oven:	CO-20605 μ L)
Mixer:	X-LC 3180MX
Column oven:	X-LC 3067CO
Autosampler:	X-LC 3159AS
Detector:	X-LC 3110MD

Conditions

Column:	ZORBAX Eclipse Plus C18 (3.0 mmID x 50 mmL, 1.8 μ m)
Eluent A:	0.1% Formic acid
Eluent B:	0.1% Formic acid in Acetonitrile
Gradient condition:	(A/B), 0 min (70/30) \rightarrow 7 min (10/90) \rightarrow 7.5 min (10/90) \rightarrow 7.55 min (70/30) 1 cycle; 10 min
Flow rate:	0.8 mL/min
Column temp.:	40°C
Wavelength:	200 - 500 nm
Injection volume:	1 mL
Standard sample:	Piperine 0.1 mg/mL in Water/ Acetonitrile (90/10)

Results

Figure 1 shows the chromatogram and the contour plot of the piperine standard sample. A longer method analysis time was used than typical for UHPLC 0000

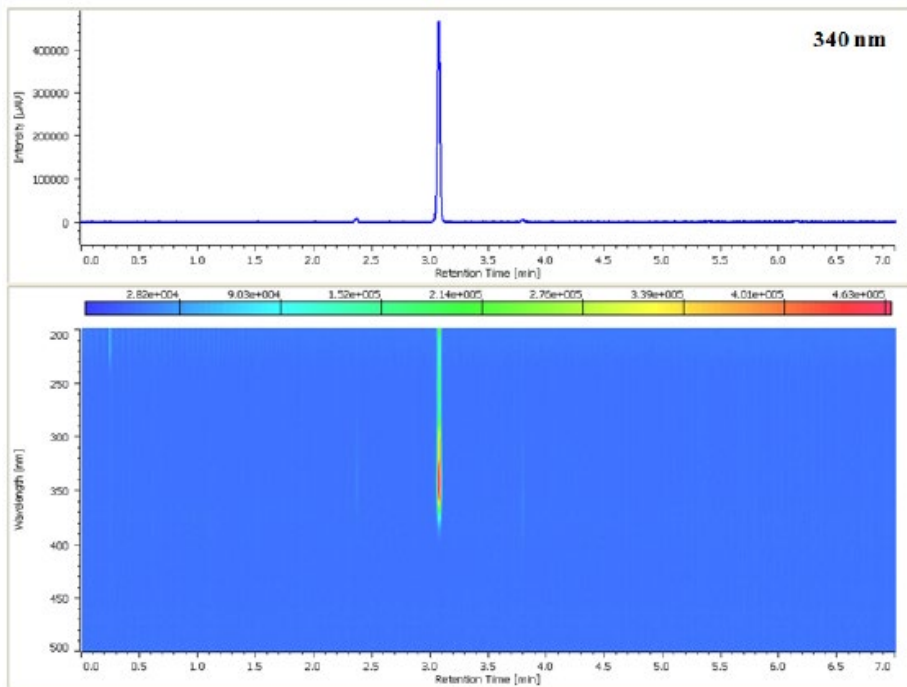


Figure 2 shows a spectrum of piperine.

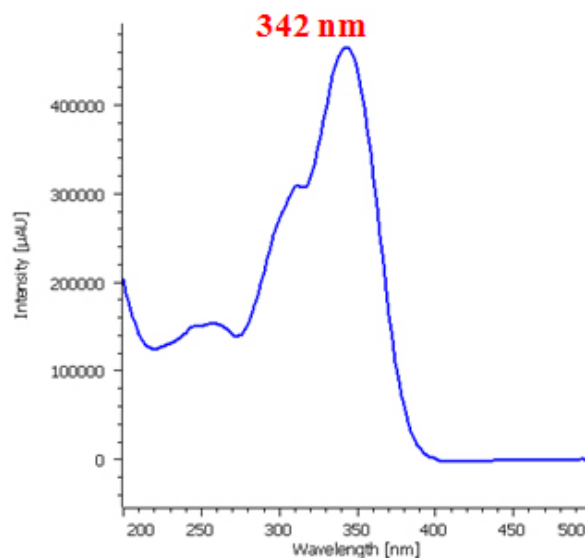


Figure 2. Spectrum of piperine sample

Figure 3 shows the chromatogram and the contour plot of the extract of coarsely ground pepper after extraction using a Supercritical Fluid Extraction system.

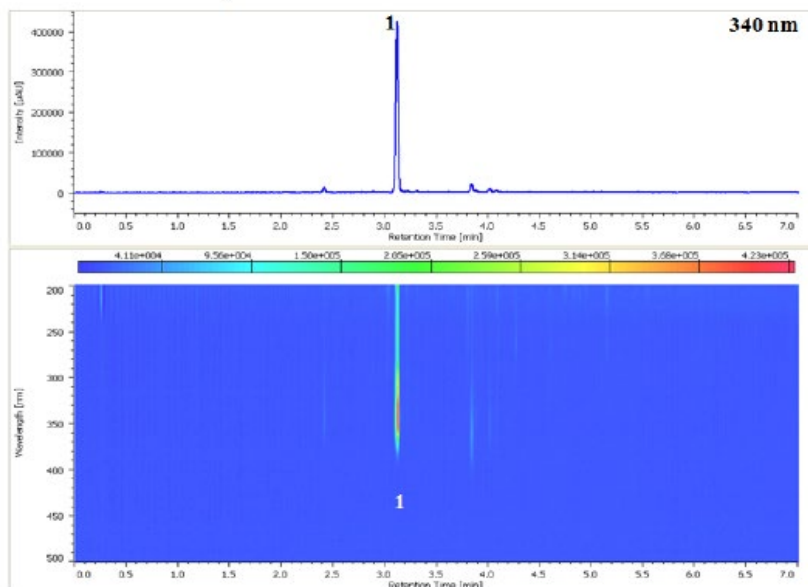


Figure 3. Chromatogram and contour plot of coarsely ground pepper
1: Piperine

Sample Preparation

Coarsely ground pepper was extracted using a Supercritical Fluid Extraction system and its extract was dissolved in 1 mL of Acetonitrile and diluted with Acetonitrile to 1/100 concentration. Then it was filtrated using 0.2 mm membrane filter

Supercritical Fluid Extraction conditions

Sample :	Coarsely ground pepper 1.0 g
Extraction vessel :	10 mL (Glass wool has been mounted in both IN and OUT)
Temperature :	40 °C.
Back Pressure :	20 MPa
CO2 Flow Rate :	3.0 mL/min
	X-LC 3110MD