APPLICATION NOTE
E181VPJ-002

Determination of Caffeine Content in Drinks

Abstract

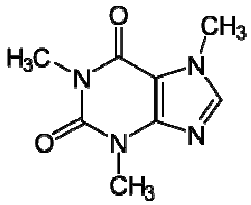
Caffeine is the most widely consumed psychoactive drug in the world. It is mainly valued for its positive effect on vigilance, concentration and focus. Aside from coffee beans, many other plants or plant parts like tea leafs contain caffeine. Coffee and tea are a natural resource of caffeine, but there are also artificially mixed drinks like caffeine containing soft or energy drinks. The caffeine content of the beverages can reach values up to 800 mg/L or even higher. HPLC is a versatile method to analyse caffeine content in many different beverages. Due to its sensitivity HPLC analysis allows the quantification of remaining caffeine, even in decaffeinated coffee products. HPLC can be used for quantification and product quality monitoring.

Keywords

- Methylxanthine
- Caffeine

Compound information

Classification	Compound name
Methylxanthine	Caffeine

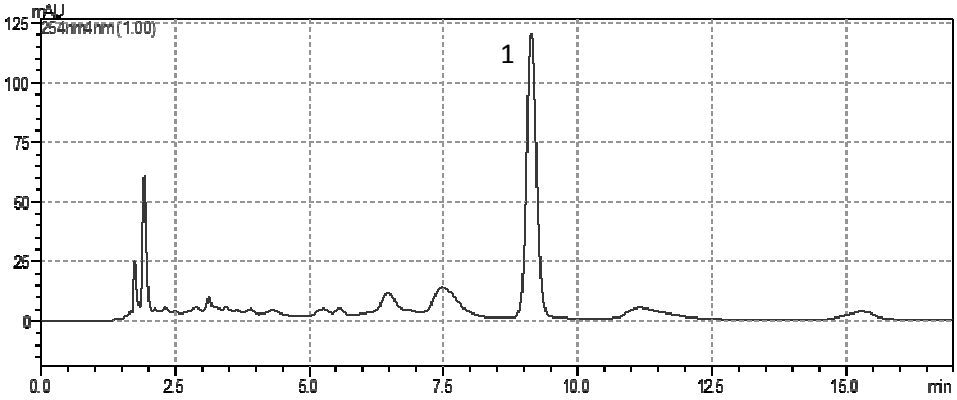


Caffeine

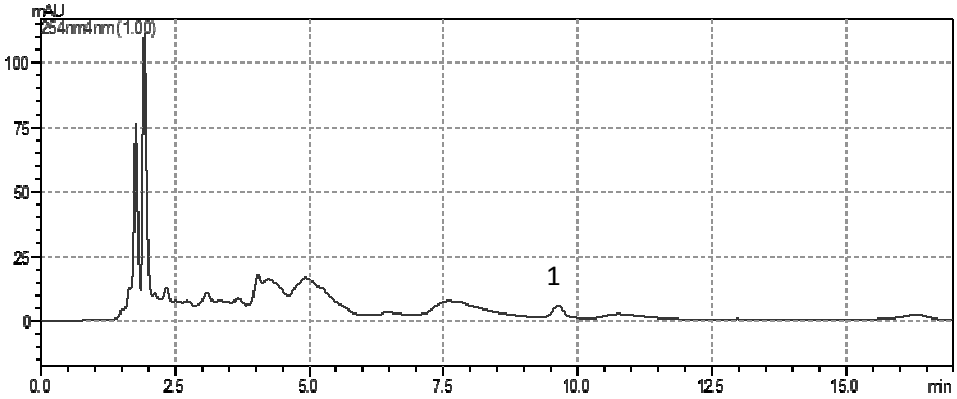
Chromatographic conditions

Column	VDSpher® PUR 100 C18-E
Particle Size, Length × inner diameter	5 µm, 150 × 4.6 mm
Order number	N1546E181VPJ
Separation mode descriptions	analytical, reversed phase
Mobile Phase	A: Water B: Methanol
Elution conditions	Isocratic 0-17 min: 27% B
Flow rate	0.8 mL/min
Injection	3 µL
Column temperature	25 °C
Pressure	
HPLC system	Shimadzu LC-20AB solvent delivery system with online degasser and SIL-20A auto sampler Detector: Photodiode array UV-vis detector (SPD-M20A, Shimadzu), wavelength: 254 nm
Sample and sample preparation	Drinks with varying caffeine content, i.e. coffee, decaffeinated coffee, Coca Cola™, Coke Zero™, Red Bull™ energy drink, black tea Preparation: Coffee and tea samples were diluted with purified water, centrifuged and the supernatant was filtered with 0.2 µm PES syringe filters. Soft drink and energy drink samples were degassed using ultrasonic and diluted with purified water (water was purified in a Merck Millipore filtration unit)

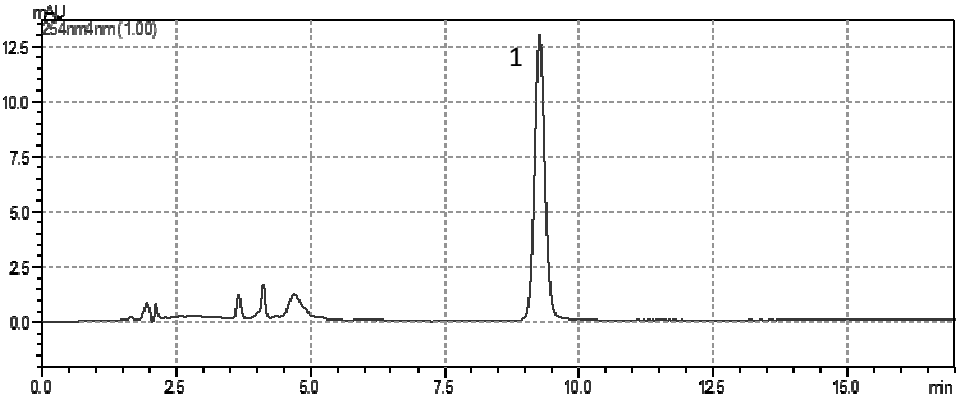
Chromatograms



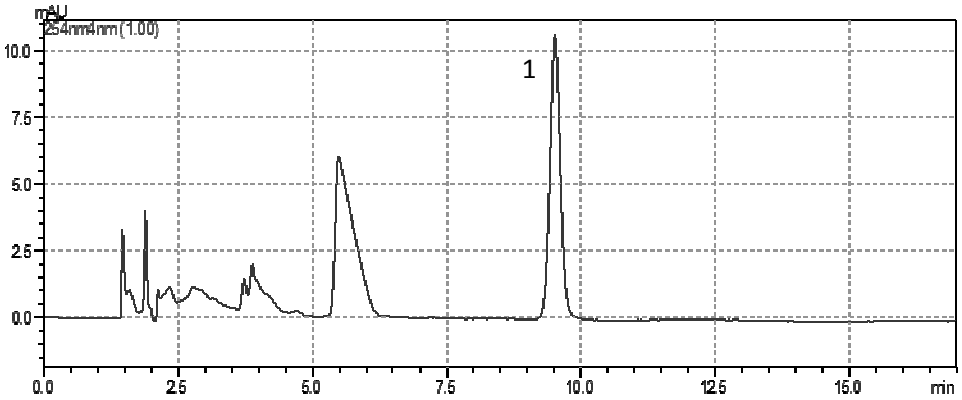
Chromatogram for coffee.



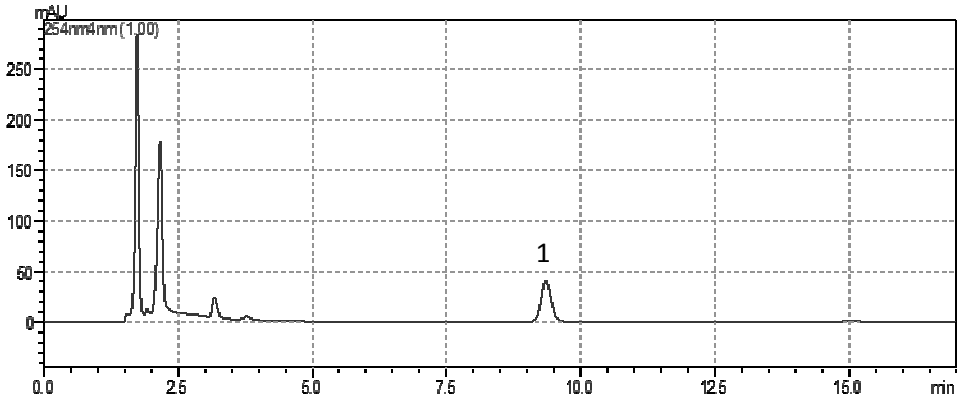
Chromatogram for decaffeinated coffee.



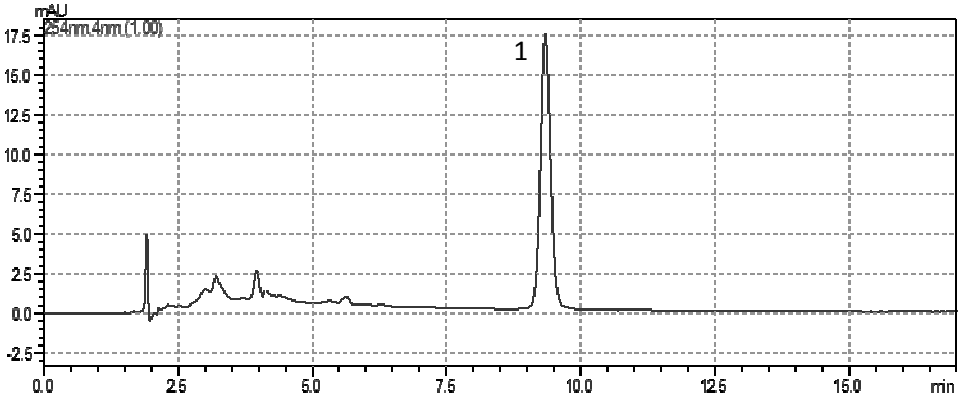
Chromatogram for Coca Cola.



Chromatogram for Coke Zero.



Chromatogram for Red Bull.



Chromatogram for black tea.

Origin

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Biothermodynamik (Biothermodynamics)

References

Year of application: 2015

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