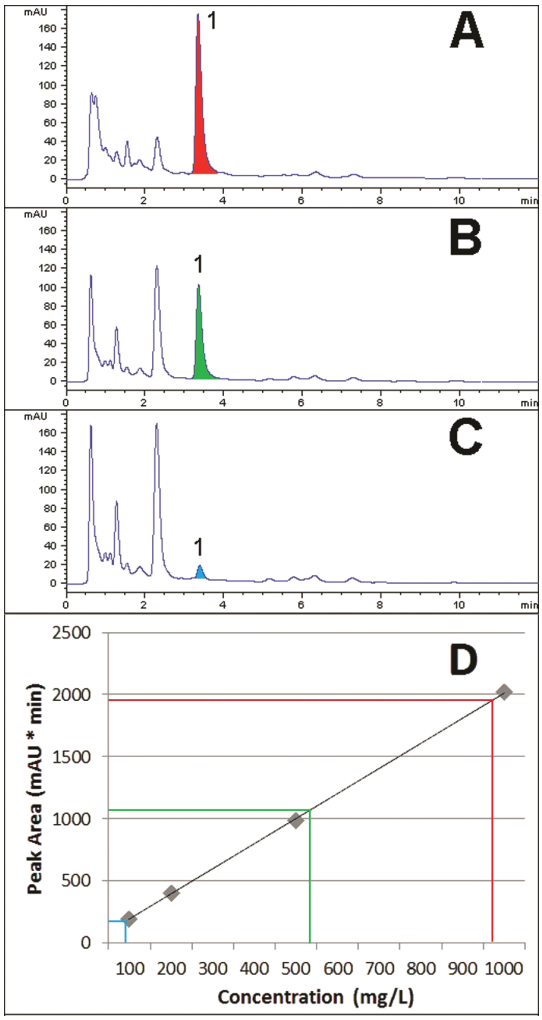
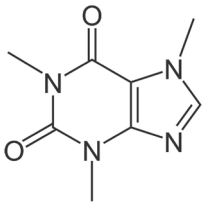
Caffeine Content in Different Beverages

Espresso, regular, and decaffeinated coffee





Caffeine

Note: Caffeine is a xanthine alkaloid found in the coffee plant, the tea bush, the kola nut, and other plants. It is the most commonly consumed psychoactive drug in the world.

Method Conditions

Column: **Cogent Bidentate C18 2.ō™**, 2.2µm, 120Å

Catalog No.: 40218-05P-2

Dimensions: 2.1 x 50 mm

Mobile Phase: 90% A: DI H_2O / 0.1% formic acid (v/v)
10% B: Acetonitrile / 0.1% formic acid (v/v)

Injection vol.: 0.5 microL

Flow rate: 0.3mL/min

Detection: UV 254 nm

Samples: Espresso, regular, and decaf coffee beverages were purchased from a local coffeehouse. The samples were filtered with 0.45 µm nylon syringe filters (MicroSolv Tech Corp.). A 1000 ppm caffeine reference standard solution was prepared in a diluent of 50/50 solvent A/solvent B. Dilutions were made from this stock solution to obtain concentrations of 100, 200, and 500 ppm.

Peaks: 1. Caffeine

t_0: 0.8 min

Discussion

In this method, caffeine is separated from other matrix components in three common coffee beverages. A shot of espresso (Fig. A) had the highest content, followed by regular drip coffee (Fig. B). In decaffeinated coffee, caffeine is extracted from the coffee beans but even after numerous extractions, the caffeine is not completely removed. This is illustrated by the chromatogram for the decaffeinated coffee sample (Fig. C), where a caffeine peak was detected.

A calibration curve was constructed in the range of 100 – 1000 mg/L (Fig. D), which provided estimates of caffeine content in the beverages: Espresso: 964 mg/L, regular: 539 mg/L, and decaf: 85 mg/L.

MANUFACTURED BY:
MICROSOLV TECHNOLOGY CORPORATION
9158 Industrial Blvd NE
Leland, NC 28451
p: 1.732.380.8900
f: 1.910.769.9435
customers@mtc-usa.com
www.Cogent-HPLC.com