

Analysis of Artificial Sweeteners Using the LaChromUltra HPLC System with UV Detection

Aspartame and acesulfame K are artificial sweeteners used to formulate many sugar-free foods and beverages. Replacing sugar with artificial sweeteners reduces caloric intake and dental decay, and provides diabetic patients with additional options to control sugar intake. Since artificial sweeteners are often much sweeter than sugar, it is important to accurately measure their concentrations in food and beverages. A method capable of analysis of aspartame, acesulfame K, and caffeine is described in the publication "Standard Methods of Analysis for Hygienic Chemists with Commentary."¹ Presented here is an application of this method toward the analysis of aspartame, acesulfame K, and caffeine in a sugar-free carbonated beverage using the Hitachi LaChromUltra HPLC.²

Experimental Conditions

Module	Conditions
Pump (L-2160U)	Mobile Phase: 15% CH ₃ CN, 85% 10 mM KH ₂ PO ₄ , pH 4 Flow Rate: 0.6 mL/min
Autosampler (L-2200U)	Injection Volume: 1 µL
Oven (L-2300)	Temperature: 40 °C
Detector (L-2400U)	210 nm
Column (891-5000)	Hitachi LaChromUltra C18, 2 µm, 2 x 50 mm

Results – Peak Area Linearity (5 – 100 mg/L)

Acesulfame K	R ² = 0.9999
Caffeine	R ² = 0.9999
Aspartame	R ² = 0.9999

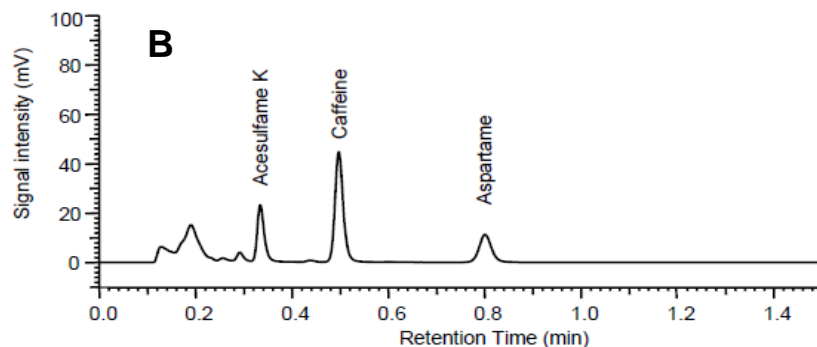
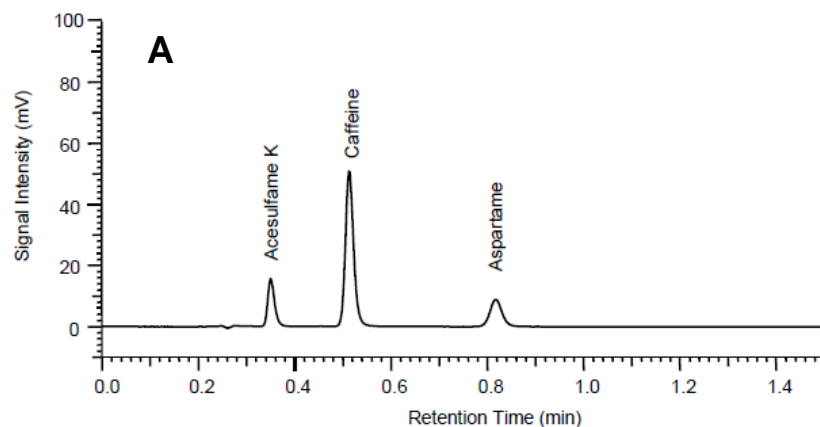
References-

- Standard Methods of Analysis for Hygienic Chemists with Commentary, 2005
- Hitachi High Technologies application note LCU100006_E

Results – Chromatographs

A. 3 component mixture: acesulfame K, caffeine, and aspartame

B. Sugar-free carbonated beverage



Discussion

Hitachi's LaChromUltra liquid chromatography system with UV detection is effective at rapid analysis of several artificial sweeteners. Acesulfame K, aspartame, and caffeine can be analyzed in sugar-free carbonated beverages within one minute.

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