[TECHNOLOGY BRIEF]

Rapid Analysis of Soft Drinks Using the ACQUITY UPLC H-Class System

GOAL

To rapidly analyze the additives acesulfame potassium, (ASK), sodium saccharin, caffeine, sodium benzoate, aspartame, and potassium sorbate in soft drinks with minimum sample preparation.

BACKGROUND

The soft drink market is an important worldwide industry generating profits for several major producers. Quality control of the manufacturing process is essential for consistency of product and to satisfy regulatory requirements. These products, especially diet formulations, can contain non-nutritive sweeteners such as acesulfame potassium (ASK), sodium saccharin, and aspartame, as well as the preservatives sodium benzoate and potassium sorbate. In the case of energy formulations, caffeine may also be present. A particular beverage can contain all or some of these analytes at varying concentrations. Due to the multitude of products, manufacturers need fast, reliable, and simple analytical techniques that do not require the use of hazardous solvents and that require minimal sample preparation for testing these beverages.

The analysis of soft drink additives can be accomplished in less than 1.5 minutes using the ACQUITY H-Class System with UV detection.

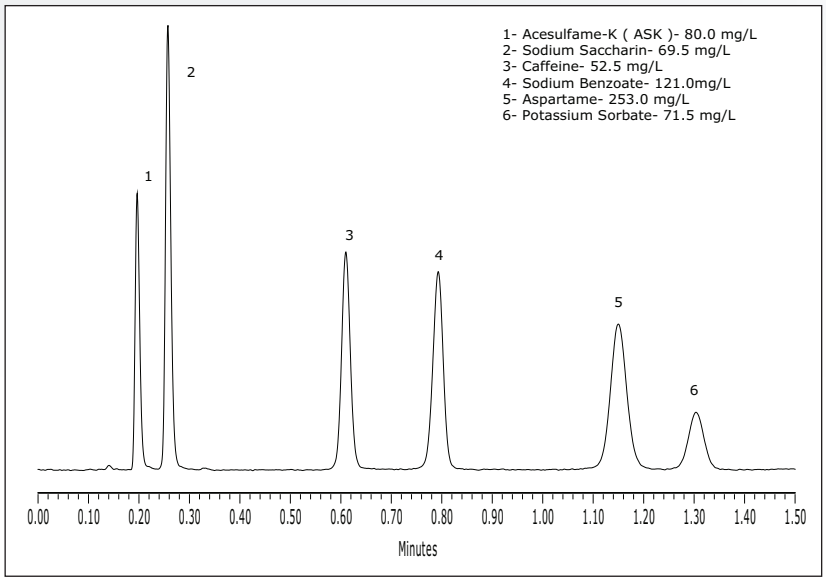

Figure 1. Soft drink standard separation on ACQUITY UPLC H-Class System.

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THE SOLUTION

The Waters® ACQUITY UPLC® H-Class System with UV detection provides a fast analytical system for detecting these analytes. Using 10% anhydrous ethanol with acetate buffering and the ACQUITY® HSS T3 Column chemistry, separation of these compounds can be achieved with a runtime of less than 1.5 min.

A stock standard was prepared by dissolving 0.1g of ASK, sodium saccharin, caffeine, and potassium sorbate, 0.2 g of sodium benzoate, and 0.5 g of aspartame in 100 mL of mobile phase. Five separate dilutions, 1:50, 1:25, 1:20, 1:10, and 1:5 of this stock were made in the mobile phase to produce a five point calibration curve. Sample preparation included a simple sonication step to remove carbonation, followed by filtration through a 0.22-µm membrane.

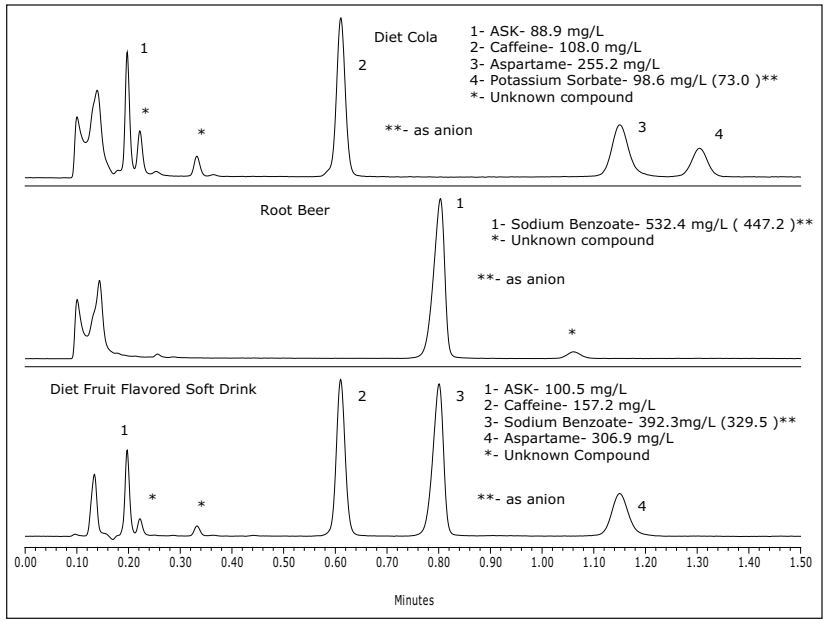

Figure 2. Analytical profiles for several soft drinks using the ACQUITY UPLC H-Class System.

SUMMARY

The analysis of soft drink additives can be accomplished in less than 1.5 minutes using the ACQUITY H-Class System with UV detection. This isocratic method allows rapid injection to injection continuity since there is no requirement for column re-equilibration. The mobile phase uses ethanol as the organic modifier eliminating the need for hazardous solvents such as acetonitrile. These factors lead to a safe, rapid, and simple analytical procedure which minimizes costs for the analytical laboratory.

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