Waters™

Application Note

Soft Drink Analysis with Waters XBridge BEH XP Columns

Mark E. Benvenuti, Kenneth J. Fountain, Jennifer A. Burgess

Waters Corporation

Abstract

This application note demonstrates a simple method for the analysis of soft drink additives (caffeine, sodium benzoate, potassium sorbate, and the diet formulations of artificial sweeteners acesulfame K, aspartame, and saccharin) using Waters' XBridge BEH *XP* Columns and the ACQUITY UPLC H-Class System.

Benefits

- Baseline resolution of six additives in a 10-minute isocratic run
- Minimal standard and sample preparation
- Ethanol based “green” chemistry

Introduction

The soft drink market is an important profit center for several beverage manufacturers. These products often contain caffeine as an energy booster, sodium benzoate and potassium sorbate as preservatives, and the diet formulations of artificial sweeteners acesulfame K, aspartame, and saccharin. A particular beverage may contain any combination of these additives in varying amounts.

For quality control purposes, the adherence of target ranges of analytes to specified values is critical. In this study, we show the efficacy of the Waters XBridge BEH *XP* columns in achieving these goals.

ACQUITY UPLC H-Class System.

Experimental

LC conditions

System:	ACQUITY UPLC H-Class
Run time:	10.0 min
Column:	XBridge BEH Phenyl Column *XP* 4.6 x 50 mm, 2.5 µm (p/n 186006073)
Vial:	LCGC Certified Clear Glass Recovery Vial (p/n 186003270)
Temp:	35 °C
Mobile phase:	Waters Beverage Mobile Phase Reagent (p/n 186006006)
Flow rate:	1.0 mL/min (isocratic)
Injection volume:	5 µL
Detection:	UV at 214 nm

Standard preparation

One Bottle of Waters Beverage Analysis Standards (p/n 186006008) was poured into one bottle of Waters Beverage Analysis Standards Solid (p/n 186006010). The bottle containing this mixture was capped tightly, and shaken vigorously until the aspartame was completely dissolved.

Sample description

Samples of a diet cola and diet fruit soft drink were sonnicated to remove carbonation, and filtered through a 0.22-µL PVDF filter. This was the only sample preparation necessary.

Results and Discussion

Figure 1 shows a chromatogram of the soft drink standard. Figures 2 and 3 show the chromatograms of a diet cola and fruit flavored beverage, respectively. The sample beverages were quantified against the soft drink standard using a single-point linear calibration. Note that there is a baseline separation of all analytes with a run time of less than 10 minutes. Using this isocratic method, there is no need for column re-equilibration between injections. The ethanol-based mobile phase has no toxicity issues, resulting in reduced disposal costs.

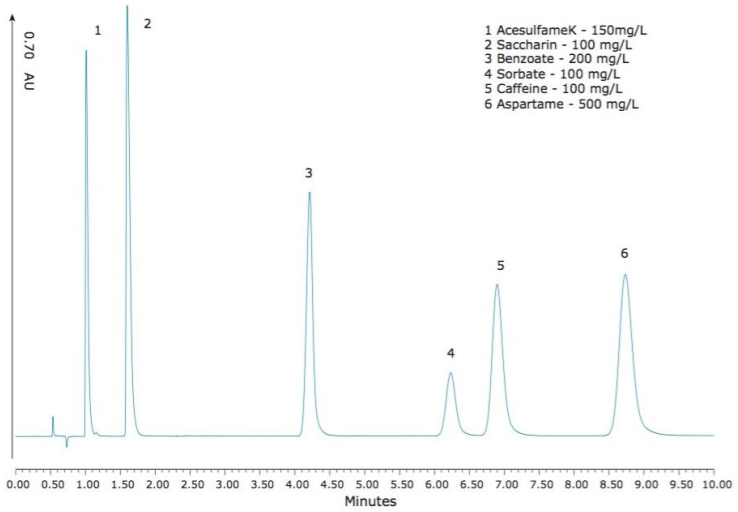

Figure 1. Soft drink standard.

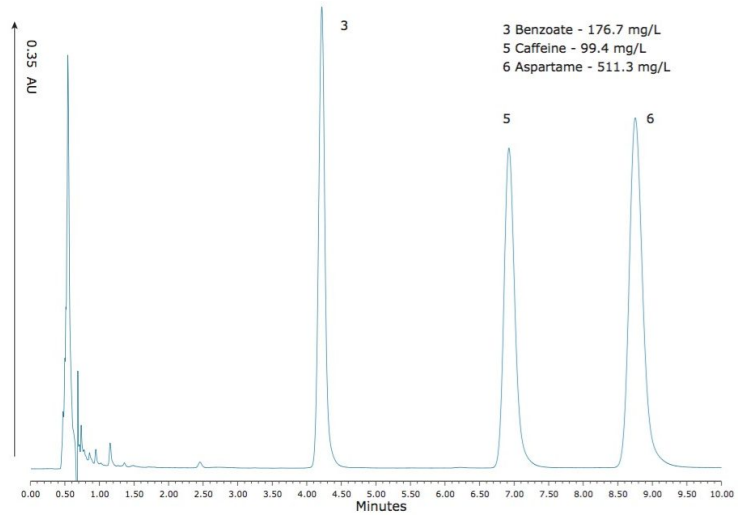

Figure 2. Diet cola.

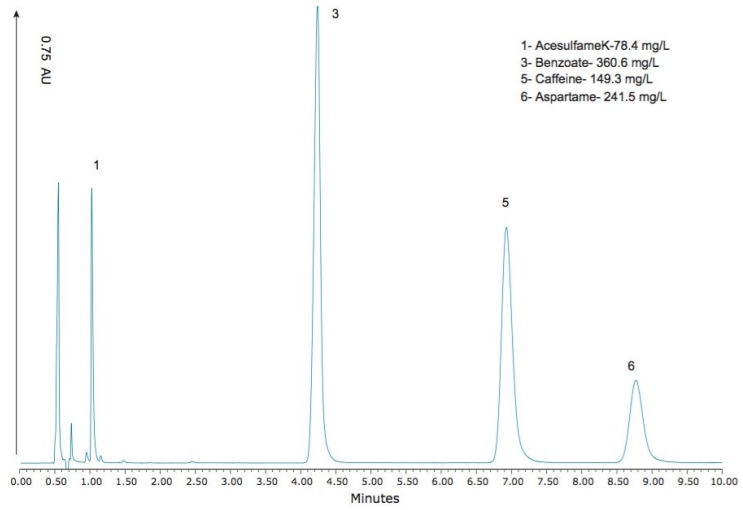

Figure 3. Diet fruit flavored beverage.

Conclusion

This application note demonstrates a simple method for the analysis of soft drink additives. Implementation of this procedure in a manufacturing environment has the capacity to improve overall workplace efficiency.

- Waters XBridge BEH Phenyl *XP* columns enable a baseline separation of soft drink analytes in less than 10 minutes.
- Ethanol-based mobile phase lowers disposal costs.
- Minimal sample preparation is required.
- This isocratic method eliminates the need for column equilibration.

Featured Products

ACQUITY UPLC H-Class PLUS System

720004589, Febraury 2013