Waters™

응용 자료

Fast Screening for Vitamins and Dyes in Health Beverages with the ACQUITY UPLC H-Class System

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This is an Application Brief and does not contain a detailed Experimental section.

Abstract

To successfully analyze a series of water-soluble vitamins and food dyes in health beverages using the ACQUITY UPLC H-Class System, with minimum sample preparation, a short run time, and minimum solvent consumption.

Benefits

The ACQUITY UPLC H-Class System delivers a rapid and robust method for the analysis of 11 water-soluble vitamins and 3 food dyes in less than 8 minutes.

Introduction

Vitamin fortification of beverages is an increasing trend that has become popular due to the poor level of nutrition that can occur in today's fast-paced lifestyle. Manufacturers add vitamins to many beverages and also use dyes to aesthetically enhance the appearance of these products. Beverage producers are legally required to accurately label their products with vitamins, dyes, and other additives that are used in the formulation of these commodities. In the case of food dyes, stringent requirements exist as to what can be added to beverages intended for human consumption. Dyes can vary from country to country. In the United States, the three main colorants are yellow 5, red 40, and blue 1.

These compounds are currently analyzed individually or in small groups using a variety of methodologies such as microbiological assays, colorimetric analysis, titrimetric procedures, fluorimetry, and HPLC. Typical HPLC methods for the analysis of a selection of food dyes can run up to 30 minutes, or, for the analysis of vitamin B6 alone, 18 minutes. The ability to simultaneously analyze water-soluble vitamins and food dyes using a single, fast, and straightforward UPLC solution provides businesses with the potential to increase sample turnover and reduce costs associated with labor and training. This improvement in efficiency can subsequently result in higher productivity and increased revenue.

Results and Discussion

The separation of 11 water-soluble vitamins and three food dyes was achieved using the ACQUITY UPLC H-Class System in less than 8 minutes. Analytes were injected on to an ACQUITY UPLC HSS T3 Column and eluted with a water/methanol (0.1% formic acid) gradient. PDA detection was employed at the optimum wavelength for each analyte.

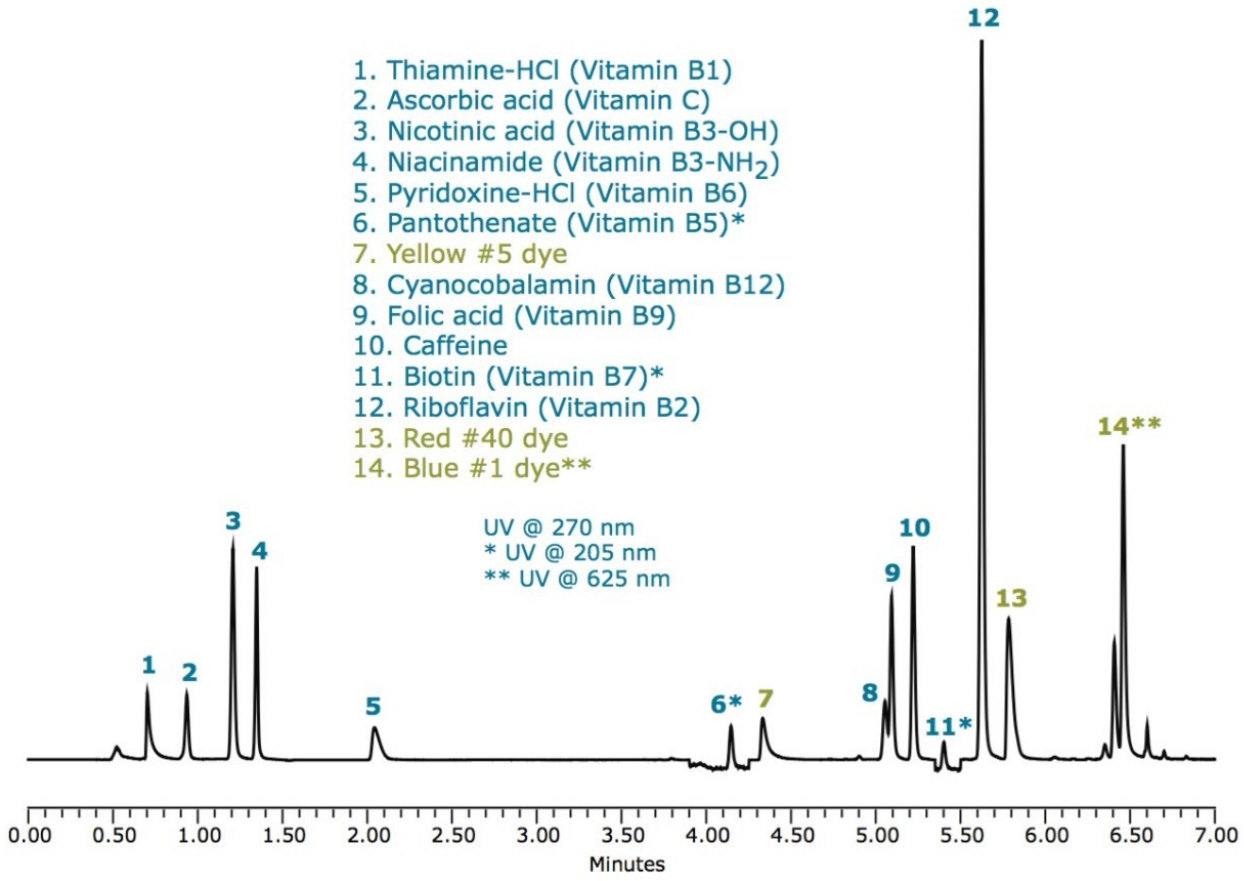

Figure 1. Separation of 11 water-soluble vitamins and 3 food dyes by UPLC using the ACQUITY UPLC H-Class System.

B-vitamin-fortified water was procured commercially. Following filtration through a 0.45 micron membrane, the sample was injected onto the column. No additional sample preparation was required. The label claim of vitamins B3, B5, and B6 was confirmed by UPLC analysis. Several unknown analytes were also detected.

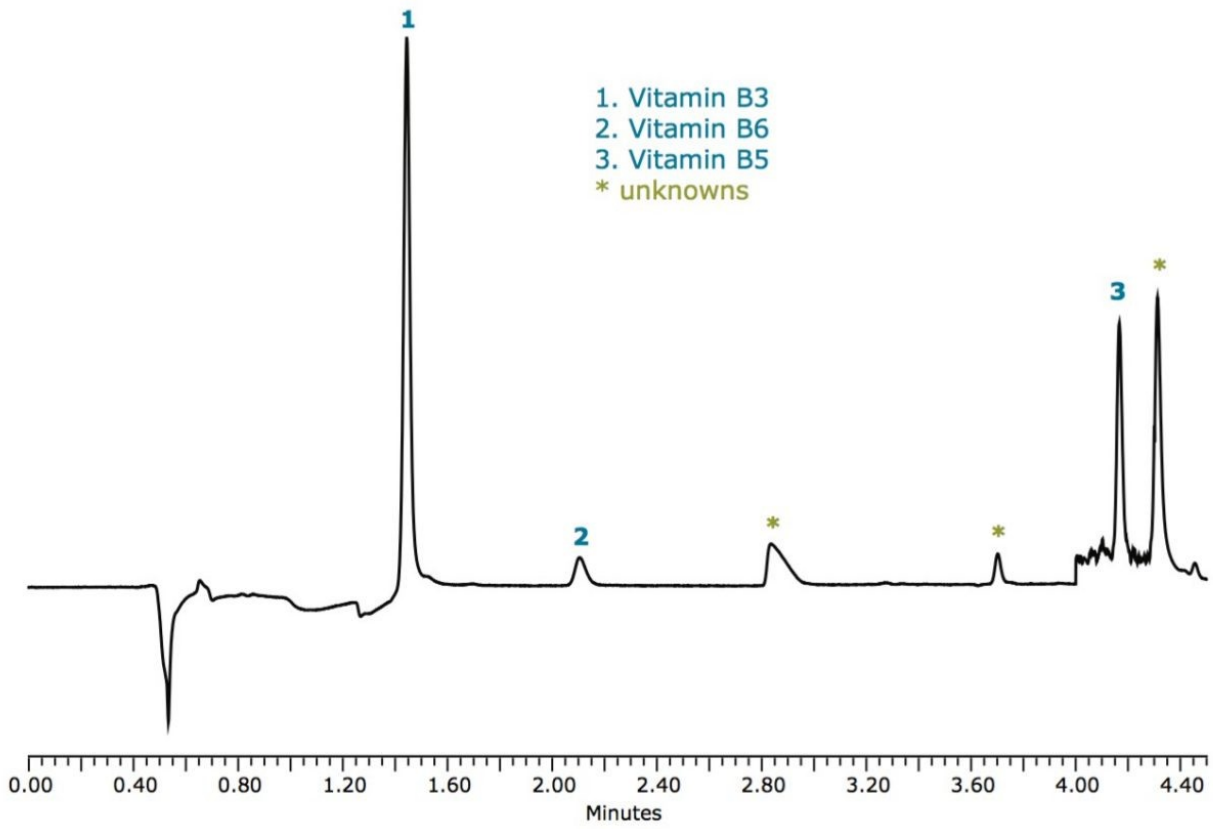

Figure 2. Analysis of commercially-available B-fortified water, confirming the presence of vitamins B3, B5, and B6.

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Conclusion

Featuring multi-solvent blending capabilities and a flow-through-needle design, the ACQUITY UPLC H-Class System provides the familiarity of HPLC instrument operation along with the improved chromatographic performance and throughput of UPLC. The ACQUITY UPLC H-Class System with PDA detection here provides a rapid and robust method for the analysis of water-soluble vitamins and food dyes in beverages that claim such health benefits. The system allows for the analysis of multiple analytes in a single platform using a straightforward workflow that is a reliable alternative to lengthy HPLC separations.

Featured Products

- ACQUITY UPLC H-Class PLUS System <https://www.waters.com/10138533>
- ACQUITY UPLC PDA Detector <https://www.waters.com/514225>

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