BUCK Scientific

Application Note #LC9002

Determination of Additives and Preservatives in Beverages by Isocratic HPLC

The Earth is 75% water, as are most life forms on Earth. People need to drink several quarts of water a day to live well, and most of us prefer to consume beverages other than water to satisfy our thirst. Soda (or Pop depending on your location) is the primary drink of the average American; and all Soda is manufactured (as opposed to coming out of the ground from a spring in Maine). As such, there are ingredients used to make the Soda, and there can be some variability in the process used to blend the ingredients. To keep the needs of the public in mind, most companies use some form of quality control methodology to monitor the ingredients and the process; as well as research and product development procedures for competitive product profiling and new product characterization.

For the beverage industry, the ideal analytical technique for both raw material QC and R&D purposes in HPLC; High-Performance Liquid Chromatography. This standardized procedure employs a Solvent or mixture of Solvents that is pushed through a high-pressure pump head using an inert sapphire piston rod and an inert fluoropolymer seal onto a column containing chromatographic media. This allows any material injected into the solvent stream to be separated into its individual components and spread out along the column. These separated "peaks" are passed through a flow-cell, which is part of the detector, and the peaks are seen on the chromatogram. It is the retention time of the peak that *identifies* the specific component, and the Area Integration of the peak determines its *concentration* relative to a reference standard.

There are many dozens of standard methods defined by regulatory agencies such as USFDA and AOAC for soft drinks, fermented and distilled beverages, fruit juices, etc. most of these deal with the measurement of *the natural components* (sugars, caffeine & other plant alkaloids, carotenes and other botanical colors) and any *synthetic additives*, sweeteners, anti-oxidants, preservatives and others (aspartame, saccharin, sorbate, TBHQ, BHA, BHT, stearate, citrate, etc).

The Buck series of HPLC systems can be easily configured with the appropriate *columns* (amino for sugars, C-18 for additives, cyano-propyl for pigments) and *detectors* (UV for additives, VIS for coloring, refractive Index for sugars, fluorescence for alkaloids and vitamins) to fit your exact needs for the specific materials and process you use. The BLC-10/20 HPLC instruments provide a stable, high-pressure pump with your choice of detectors, all controlled by the well-known and easy-to-use PeakSimple data station software package.

Analyst: Gerald J. DeMenna, Ph.D.

Determination of Additives and Preservatives in Beverages by Isocratic HPLC

Method: Isocratic HPLC
Description: BLC-10 / 254nm
Column: 15cm. C-18 / 3nm
Carrier: 60:40 MeOH-H2O
Sample: 25uL Diet Fruit Drink
Operator: Dr. Jerry DeMenna

Number	Components	Retention	Area	External Units
1	Citric Acid	1.083	5937.684	0.75%
2	Aspartame	2.200	6254.932	118.40ppm
3	Ascorbic Acid	3.966	5233.848	1.32%
4	K-Sorbate	4.150	13431.456	50.48ppm
5	Caffeine	4.650	6134.860	0.92%
6	Na-Benzoate	6.483	6126.987	21.67ppm
7	Ca-Saccharin	7.100	6128.687	74.10ppm
8	Caramel Color	11.550	6385.786	2.13%
			55634.240	269.78

BUCK Scientific

1-800-562-5566

58 Fort Point Street East Norwalk CT 06855
Tel: 203-853-9444 Fax: 203-853-0569
www.bucksci.com sales@bucksci.com