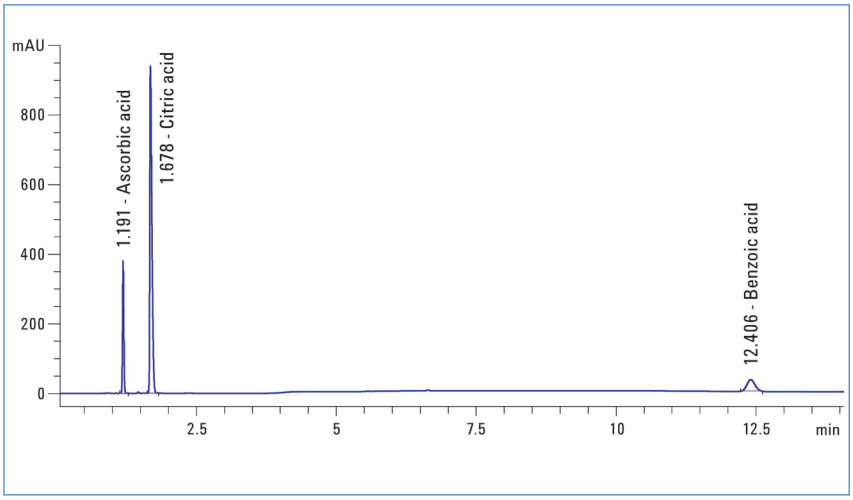
Application Solution

Analysis of ascorbic acid, citric acid and benzoic acid in orange juice



- Method development
- Method validation
- Sample preparation
- Real-life sample analysis

Abstract

Food additives, such as antioxidants and preservatives, are added to increase the shelf life of food items. In this Application Solution, we describe a method to quantify an antioxidant (vitamin C) and preservatives (citric acid, benzoic acid) in orange juice. The method was developed on the Agilent 1260 Infinity LC system using an Agilent Poroshell EC-C18 column. During sample recovery studies, greater than 90% recovery was obtained for all the three compounds. The method was effectively converted to a short UHPLC method using an Agilent 1290 Infinity LC system. This new method was 5x faster with the same LOD for benzoic acid. Both methods can be effectively applied by food manufacturers for quality control of food additives.

Scope and Benefits

Antioxidants, such as ascorbic acid prevent oxidation by decreasing the available oxygen in the environment. Preservatives, such as citric acid or benzoic acid prevent or inhibit the growth of microorganisms in food. Although the regulatory limit for benzoic acid in fruit juices is 400 to 600 µg/mL there are concerns about the liberation of carcinogenic benzene by reaction of benzoic acid with ascorbic acid under certain conditions.

The AOAC Official Method 994.11 shows the UV-based detection of benzoic acid in orange juice. In this Application Solution we describe a method to simultaneously quantify ascorbic acid, citric acid and benzoic acid using UV based detection and a simple extraction procedure.

Analytes

Ascorbic acid, Benzoic acid, Citric acid

Matrix

Orange juice

Ordering Information

Agilent 1260 Infinity Binary LC	
Description	**Part Number**
• 1260 Infinity Binary Pump	G1312B
• 1260 Infinity Vacuum Degasser	G1379B
• 1260 Infinity High performance Autosampler with Thermostat	G1367E G1330B
• 1260 Infinity Thermostatted Column Compartment	G1316A
• 1260 Infinity Diode Array Detector	G4212B

Agilent 1290 Infinity LC	
Description	**Part Number**
• 1290 Infinity Binary Pump with integrated vacuum degasser	G4220A
• 1290 Infinity High Performance Autosampler with Thermostat	G4226A G1330B
• 1290 Infinity Thermostatted Column Compartment	G1316C
• 1290 Infinity Diode Array Detector	G4212A

Software

Agilent ChemStation B.04.03 or higher

Columns

Description	**Part Number**
ZORBAX Poroshell 120 EC-C18 4.6 x 100 mm, 2.7 µm	697975-302

Chemicals

HPLC grade solvents
All chemicals were purchased from regular suppliers

For full details of this application see
Agilent Application Note 5990-8720EN

www.agilent.com/chem/lc

Published in Germany September 1, 2011
5990-9033EN

Agilent Technologies