



Analysis of Antioxidants in Chewing Gum using HPLC

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Food

Abstract

The following compounds are used as antioxidants in food products:¹

Natural antioxidants:

- vitamin C
- vitamin E

Synthetic antioxidants:

- BHT butylated hydroxytoluene
- BHA butylated hydroxyanisole
- TBHQ mono-tert-butylhydroquinone
- THBP 2,4,5-trihydroxybutylphenone
- PG propyl gallate
- OG octyl gallate
- DG dodecyl gallate
- Ionox-100 4-hydroxymethyl-2,6-di(tert-butyl) phenol
- NDGA nordihydroguaiaretic acid
- TDPA 3,3'-thiodipropionic acid
- ACP ascorbyl-palmitate

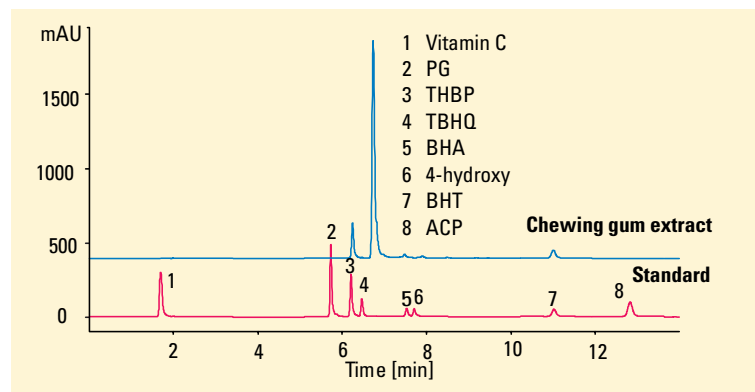


Figure 1
Analysis of antioxidants in chewing gum

Conditions

Column 100 × 4 mm BDS, 3 µm

Mobile phase

A = water + 0.2 ml H₂SO₄, pH = 2.54

B = ACN

Gradient

start with 10% B; at 3 min 60% B

at 4 min 80% B; at 11 min 90% B

Flow rate 0.5 ml/min

Post time 4 min

Column compartment 30 °C

Injection vol 5 µl

Detector

UV-DAD detection wavelength 260/40 nm,
reference wavelength 600/100 nm

Sample preparation

Ultrasonic liquid extraction with
acetonitrile (ACN)



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Antioxidants may be naturally present in food, or they may be formed by processes such as smoking. Examples of natural antioxidants include tocopherols (vitamin E) and ascorbic acid (vitamin C). A second category of antioxidants comprises the wholly synthetic antioxidants. When these antioxidants are added to foodstuffs, they retard the onset of rancidity by preventing the oxidative degradation of lipids. In most countries where antioxidants are permitted either singly or as combinations in foodstuffs, maximum levels for these compounds have been set.²

Sample preparation

Sample preparation depends strongly on the matrix to be analyzed. For samples low in fat, liquid extraction with ultrasonic bath stimulation can be used. For samples with more complex matrices, solid-phase extraction, liquid/liquid extraction, or steam distillation may be necessary.

Chromatographic conditions

HPLC and UV-visible diode-array detection have been applied in the analysis of antioxidants in chewing gum. Spectral information and retention times were used for identification.

HPLC method performance

Limit of detection

0.1–2 ng (injected amount),
S/N = 2

Repeatability of

RT over 10 runs <0.2 %
areas over 10 runs <1 %

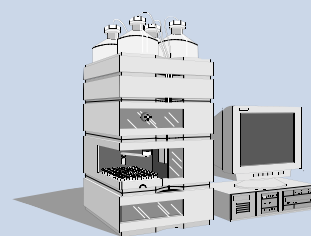
References

1. Official Methods of Analysis, Food Compositions; Additives, Natural Contaminants, 15th ed; AOAC: Arlington, VA, **1990**, Vol. 2.; AOAC Official Method 983.15: Antioxidants in oils and fats.
2. M. Rothaupt, "Food Analysis, Introduction and Applications", *Agilent Technologies Publication Number 5963-2317E*, **1994**.

Equipment

Agilent 1100 Series

- vacuum degasser
- quaternary pump
- autosampler
- thermostatted column compartment
- diode array detector, Agilent ChemStation + software



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