

Application

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Analyze Sterols, Using a Special-Purpose Capillary GC Column

A specially tested capillary GC column, the SAC-5 column, provides consistent analyses of cholesterol and numerous other plant and animal sterols. Analyses of sterols in several foods are shown.

Key Words:

- sterols • cholesterol • food oils

A capillary column from Supelco, the SACTM-5 column, is specially manufactured and tested for separating plant and animal sterols (Table 1). This 30m x 0.25mm ID column (bonded 0.25 μ m film of 5% phenyl/95% dimethylpolysiloxane) provides reproducible relative retention times for the sterols in Table 2. The column's low bleed and wide analytical temperature range offer the user great versatility.

Sterols can be analyzed on an SAC-5 column without derivatization, but fats in a sample typically must be extracted and saponified to isolate the sterols. The sterols will be in the nonsaponifiable fraction, along with other large molecular weight alcohols, fat-soluble vitamins, and hydrocarbons. Vegetable oils, which are almost pure fat, do not require extraction prior to saponification. We have found the general saponification procedure outlined by the AOAC to be useful for preparing most samples (1). Other procedures also can be used.

Table 1. Key Features of SAC-5 Columns

- Reproducible retention times for plant and animal sterols, relative to internal standard (5- α -cholestane)
- Wide analytical temperature range (subambient to 320°C), low bleed
- Only commercial column specially tested for sterols

Table 2. Sterols Separated on SAC-5 Columns

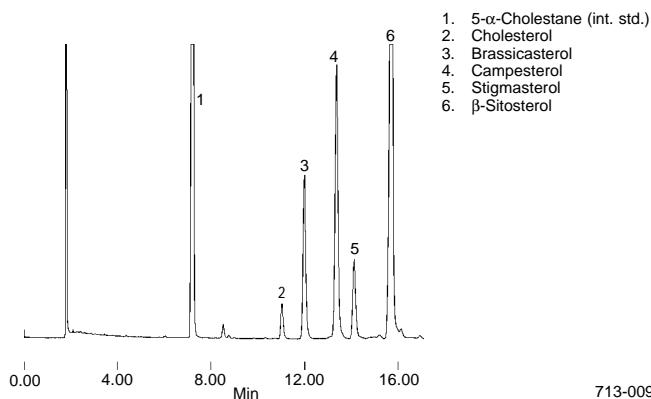
| | |
|---|---------------------|
| Brassicasterol | Desmosterol |
| Campesterol | Ergosterol |
| Cholestanol | Lanosterol |
| Cholesterol | β -Sitosterol |
| Coprostanol | Stigmasterol |
| 5- α -Cholestane (internal standard) | |

NOTE: To protect the column from nonvolatile compounds, we used a split/splitless cup-type splitter injection port liner packed with 10% OV[®]-1 on Chromosorb[®] W HP. There were no apparent differences in analyses of samples with and without the packed liner.

For injection port liners packed with 10% OV-1 on Chromosorb W HP, please contact our Customer Service Department.

Figure A. Sterols Test Mix on an SAC-5 Column

Column: SAC-5, 30m x 0.25mm ID, 0.25 μ m film
Cat. No.: 24156
Oven: 285°C
Carrier: helium, 20-25cm/sec set at 285°C
Det.: FID, 300°C
Inj.: 1 μ L sterols test mix, split 100:1
(60-70cc/min splitter vent flow), 300°C



Figures A-C show that the SAC-5 column provides excellent resolution of sterols isolated from a wide range of food sample matrices.

If you are currently analyzing sterols, or will do so in the future, we recommend this column to you.

Ordering Information:

| Description | Cat. No. |
|---|--------------|
| SAC-5 Capillary Column 30m x 0.25mm ID fused silica, 0.25 μ m phase | 24156 |

Acknowledgment

Roberto Ferrari, Sigma-Aldrich, Italy, provided translations of Italian methodology for olive oil sterols analysis.

Reference

1. Method 970.51, *Official Methods of Analysis* (15th Ed.) Association of Official Analytical Chemists, Arlington, VA (1990).

Trademarks

Chromosorb—Celite Corp.
SAC—Sigma-Aldrich Co.
OV—Ohio Valley Specialty Chemical Co.

Contact our Technical Service Department
(phone 800-359-3041 or 814-359-3041, FAX 800-359-3044 or 814-359-5468) for expert answers to your questions.

Figure B. Sterols in Olive Oil

Column: SAC-5, 30m x 0.25mm ID, 0.25µm film
 Cat. No.: 24156
 Oven: 265°C
 Carrier: helium, 20-25cm/sec set at 265°C
 Det.: FID, 300°C
 Inj.: 1µL, split 100:1
 (60-70cc/min splitter vent flow), 300°C

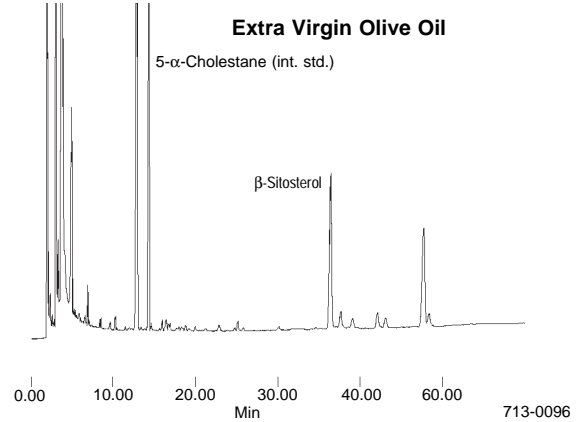
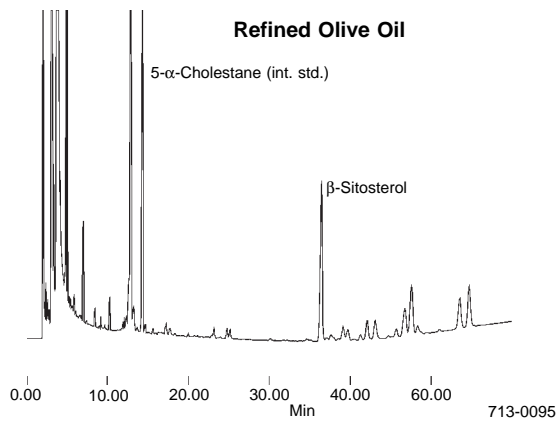
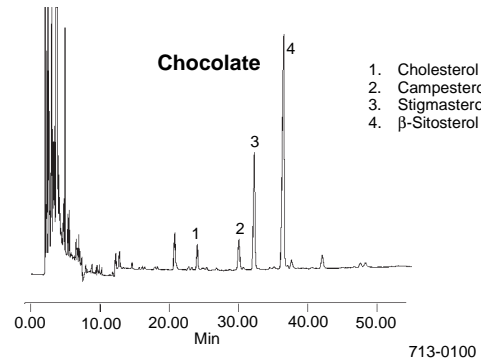
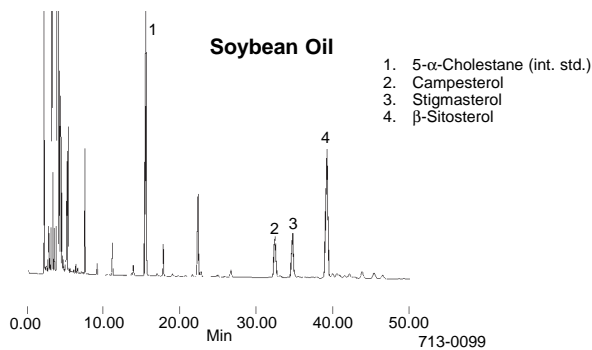
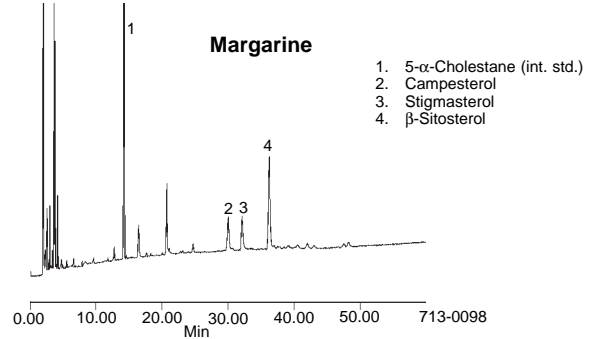
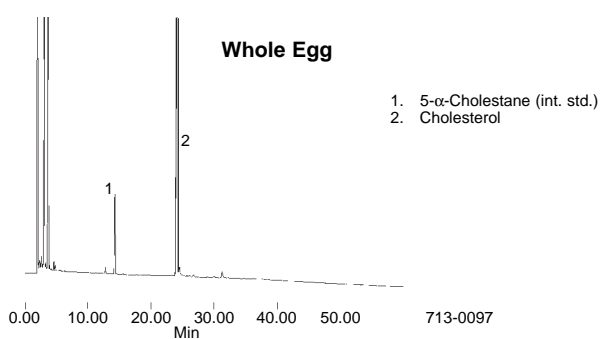


Figure C. Sterols in Various Foods

Column: SAC-5, 30m x 0.25mm ID, 0.25µm film
 Cat. No.: 24156
 Oven: 265°C
 Carrier: helium, 20-25cm/sec set at 265°C
 Det.: FID, 300°C
 Inj.: 1µL, split 100:1
 (60-70cc/min splitter vent flow), 300°C



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