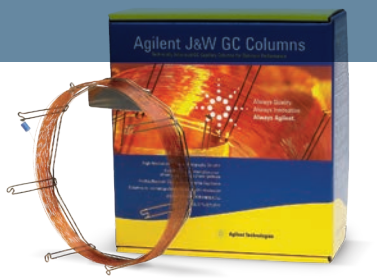
Agilent CrossLab
From Insight to Outcome

Comprehensive Analysis of FAMEs, Fatty Acids, and Triglycerides

Agilent J&W GC columns for food nutrition testing



Agilent

Maintain the Highest Standards for Product Content, Quality, and Purity

To optimize processing, taste, texture, and shelf life, you must thoroughly test the oils and fats that go into your products.

The most common analytical methods rely on indirect GC analysis of free fatty acids or fatty acid methyl esters (FAMEs). Direct analysis of triglycerides—as well as mono- and diglycerides—also provides insights into fat and oil characterization, and can be paired with the analysis of cholesterol and other lipids.

Agilent J&W GC columns for fat and oil analysis were developed and tested for qualitative and quantitative analysis of FAMES, free fatty acids, and triglycerides. Our comprehensive, innovative column portfolio enables you to achieve fast, accurate, and reproducible separations for both simple and complex samples.

This easy-reference guide will help you select the right column for your application.
It includes:

- Detailed chromatograms and analytical conditions
- Column specifications
- Selection charts based on specific analytes

Accurately determining total fat content is critical to complying with food identity and nutritional labeling laws

Tests run by food testing labs (under 'nutrition label testing')

- Fat profile (total fat, saturated fat, monosaturated fat, trans fat from fatty acids)
- Free fatty acids
- Omega 3 fatty acids
- Omega 3, 6 fatty acids

Agilent's comprehensive portfolio for fatty acid and oils analysis

Each Agilent J&W GC column is tested with the tightest industry QC specifications for column bleed, sensitivity, and efficiency to give you utmost confidence in your qualitative and quantitative results.

DB-FATWAX Ultra Inert

Fast separation of saturated/unsaturated FAMEs

- Ideal for omega 3 and 6 analysis and chain length/degree of unsaturation
- Simple FAME mixtures, no cis-trans separation
- Free fatty acids, C4-C16
- Superior inertness for difficult samples (for example, food matrix)
- For more information, see page 5

DB-FastFAME

Fast analysis of saturated/unsaturated FAMEs, including positional geometric cis-trans isomers

- Most nutrition-labeling FAMEs resolved in under eight minutes, including key cis-trans isomers
- Separation of a 63-FAME mix, including cis-trans positional isomers, in less than 48 minutes
- Robust and faster separation than high cyanopropyl phases
- For more information, see page 8

CP-Sil 88 and HP-88

Traditional analysis of positional geometric FAME isomers

- Detailed analysis of positional cis-trans FAMEs
- As suggested in AOAC 996.06 and AOCS Ce 1j-07 methods
- Ideal for CLA FAMEs and partially hydrogenated vegetable oils (PHVO)
- For more information, see page 11

Select FAME

Most detailed analysis of FAMEs, complementary selectivity to CP-Sil 88 for FAME/HP-88 phases

- Best choice for positional cis-trans FAMEs
- Alternative option to CP-Sil 88 for FAME/HP-88 selectivities
- Ideal for GC/MS applications
- Largest column commercially available (up to 200 m)
- For more information, see page 12

CP-TAP CB and Chromspher

Triglyceride and cholesterol analysis by GC and LC

- Mono-, di- and triglycerides analysis
- Complementary techniques for ehanced selectivity for isomeric triglycerides
- Ideal for high-temperature applications
- Unique selectivity also for isomeric FAMEs
- For more information, see page 14

DB-FATWAX Ultra Inert: Fast separation of saturated/unsaturated FAMEs

The DB-FATWAX Ultra Inert is designed for the separation of fatty acid methyl esters (FAMEs), fatty acid ethyl esters (FAEEs) and fatty acids. This column is tested with a FAME mixture to ensure reproducible FAME equivalent chain length (ECL) values, proper identification of important FAMEs such as EPA, DPA, and DHA, and resolution of key pairs of FAMEs. Because of Agilent's proprietary Ultra Inert technology, DB-FATWAX UI is the only WAX-type phase that is able to offer symmetric peaks for even challenging polar compounds such as free fatty acids. This feature improves inertness, thermal stability, and column lifetime compared to traditional WAX columns.

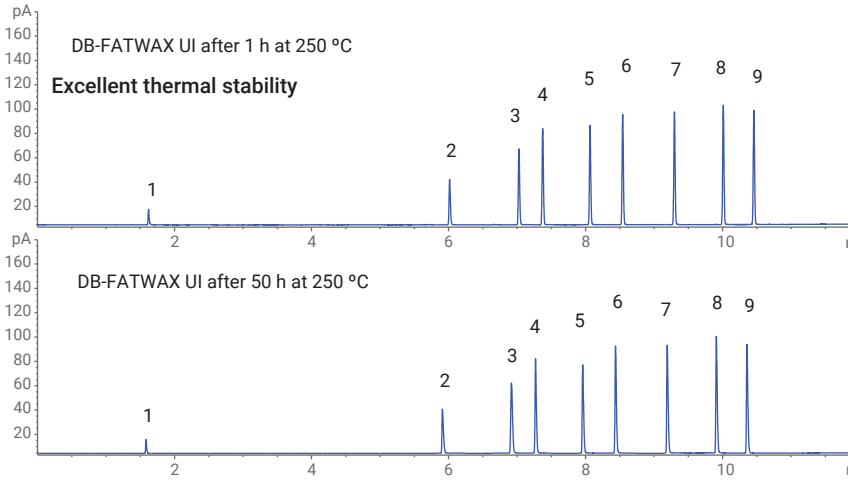
Did you know?

The triglyceride of butyric acid makes up 3-4% of butter, and is responsible for the unpleasant odor in rancid milk.

– J. Dairy Science,
48, 1582-1584, 1965

Fatty acid analysis

Analysis of short-chain free fatty acid



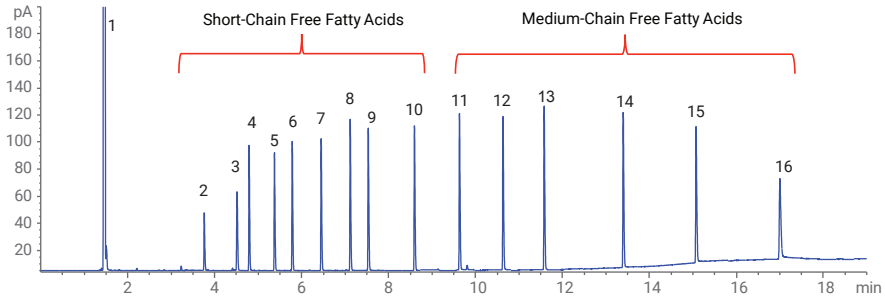
Chromatograms of short-chain volatile organic acids (C1-C6) on a DB-FATWAX Ultra Inert column after conditioning for 1 h and 50 h at 250 °C.

Conditions:

GC system:	Agilent 7890B
Column:	DB-FATWAX UI, 30 m x 0.25 mm, 0.25 µm (p/n G3903-63008)
Inlet:	250 °C, split ratio= 25:1
Carrier gas:	Helium, 40 cm/s @ 80 °C
Oven:	80 °C (1min), to 200 °C @ 10 °C/min
FID:	250 °C
Injection volume:	0.5 µL

1. Formic acid
2. Acetic acid
3. Propionic acid
4. Isobutyric acid
5. Butyric acid
6. Isovaleric acid
7. Valeric acid
8. 4-Methylvaleric acid
9. Hexanoic acid

Analysis of short-chain and medium-chain free fatty acids



FID chromatograms of fatty acid test mix on DB-FATWAX Ultra Inert column after conditioning 1 h at 250 °C.

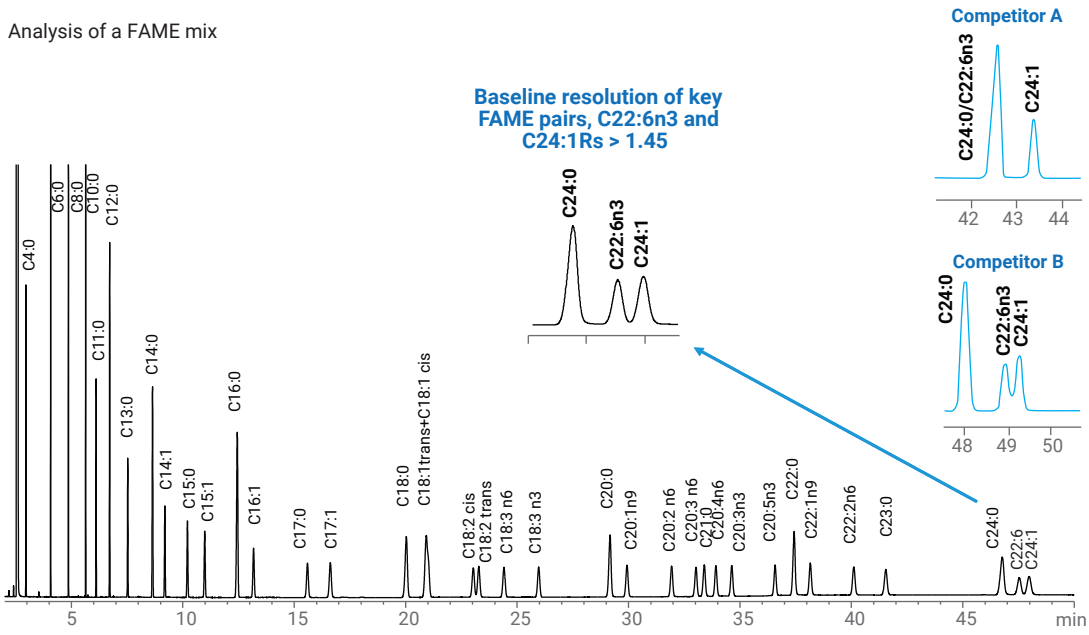
Conditions:

GC system:	Agilent 7890B
Column:	DB-FATWAX UI, 30 m x 0.25 mm, 0.25 µm (p/n G3903-63008)
Inlet:	280 °C, split mode, split ratio=50:1, 40 cm/s
Carrier gas:	Helium, constant flow mode, 38 cm/s
Oven:	100 °C to 250 °C @ 10 °C/min, 260 °C (10 min)
FID:	20 °C
Injection volume:	1 µL
Sample:	Approximately 0.5 mg/mL each component in acetone

1. Acetone and formic acid
2. Acetic acid
3. Propionic acid
4. Isobutyric acid
5. Butyric acid
6. Isovaleric acid
7. Valeric acid
8. 4-Methylvaleric acid
9. Hexanoic acid
10. Heptanoic acid
11. Octanoic acid
12. Nonanoic acid
13. Decanoic acid
14. Lauric acid
15. Myristic acid
16. Palmitic acid

FAME analysis

Analysis of a FAME mix



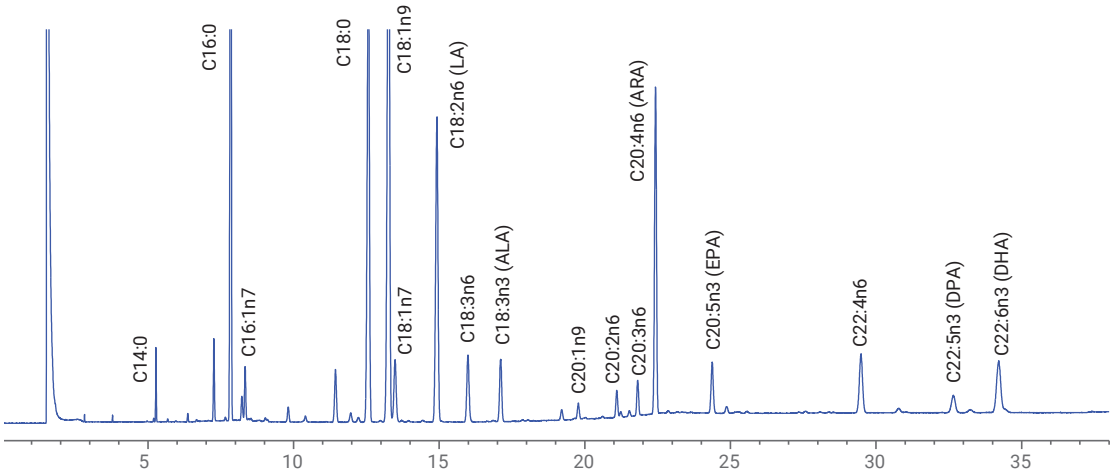
DB-FATWAX Ultra Inert columns resolve DHA from common interferences.

Conditions:

GC system:	Agilent 7890B
Column:	DB-FATWAX UI, 30 m x 0.25 mm, 0.25 µm, (p/n G3903-63008)
Inlet:	250 °C, split/splitless mode, split ratio 50:1
Carrier:	Helium, constant flow, 40 cm/s @ 50 °C
Oven:	50 °C (2 min), 50 °C/min to 174 °C (14 min), 2 °C/min to 215 °C (25 min)
FID:	280 °C, Hydrogen: 40 mL/min, Air: 400 mL/min, make-up gas: 25 mL/min
Injection:	1 µL

Good peak shape was achieved for two PUFA (polyunsaturated fatty acid) methyl ester mixes.
These complex qualitative standard mixtures are used to verify the presence of omega 3 and omega 6 FAMEs.

PUFA No. 2 (animal source FAMEs)

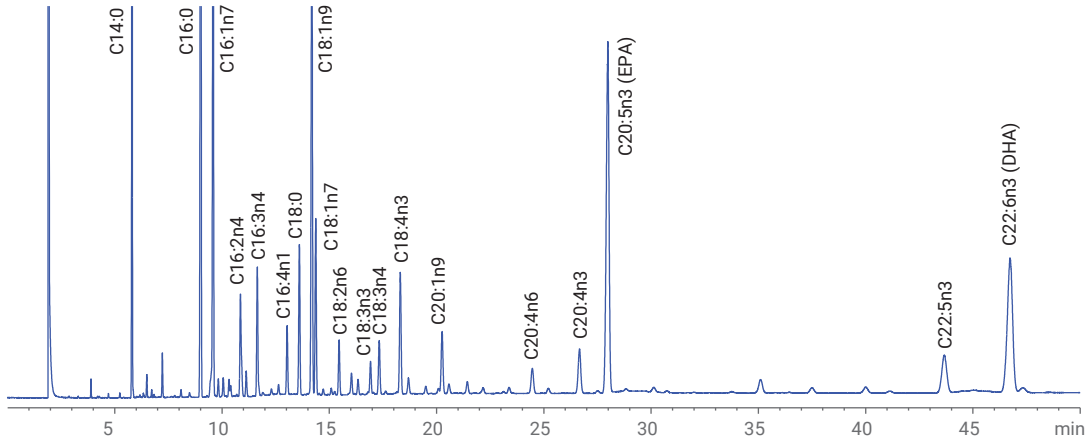


Baseline resolution for EPA, DHA, and other key omega 3/6 FAMEs found in animal fat.

Conditions:

GC system:	Agilent 7890B
Column:	DB-FATWAX UI, 30 m x 0.25 mm, 0.25 µm (p/n G3903-63008)
Inlet:	250 °C, split/splitless mode, split ratio 100:1
Carrier:	Helium, constant flow, 1.4 mL/min
Oven:	140 °C, 15 °C/min to 190 °C (11 min), 4 °C/min to 220 °C (20 min)
FID:	280 °C, Hydrogen: 40 mL/min, Air: 400 mL/min, make-up gas: 25 mL/min
Injection:	1 µL
Sample:	PUFA No. 2 (diluted)

PUFA No. 3 (menhaden oil FAMEs)



Baseline resolution for EPA, DHA, and other key omegas found in menhaden oil.

Conditions:

GC system:	Agilent 7890B
Column:	DB-FATWAX UI, 30 m x 0.25 mm, 0.25 µm (p/n G3903-63008)
Inlet:	250 °C, split/splitless mode, split ratio 100:1
Carrier:	Helium, constant flow, 30 cm/s @ 180 °C
Oven:	180 °C (2 min), 2 °C/min to 210 °C (35 min)
FID:	280 °C, Hydrogen: 40 mL/min, Air: 400 mL/min, make-up gas: 25 mL/min
Injection:	1 µL
Sample:	PUFA No. 3 (diluted)

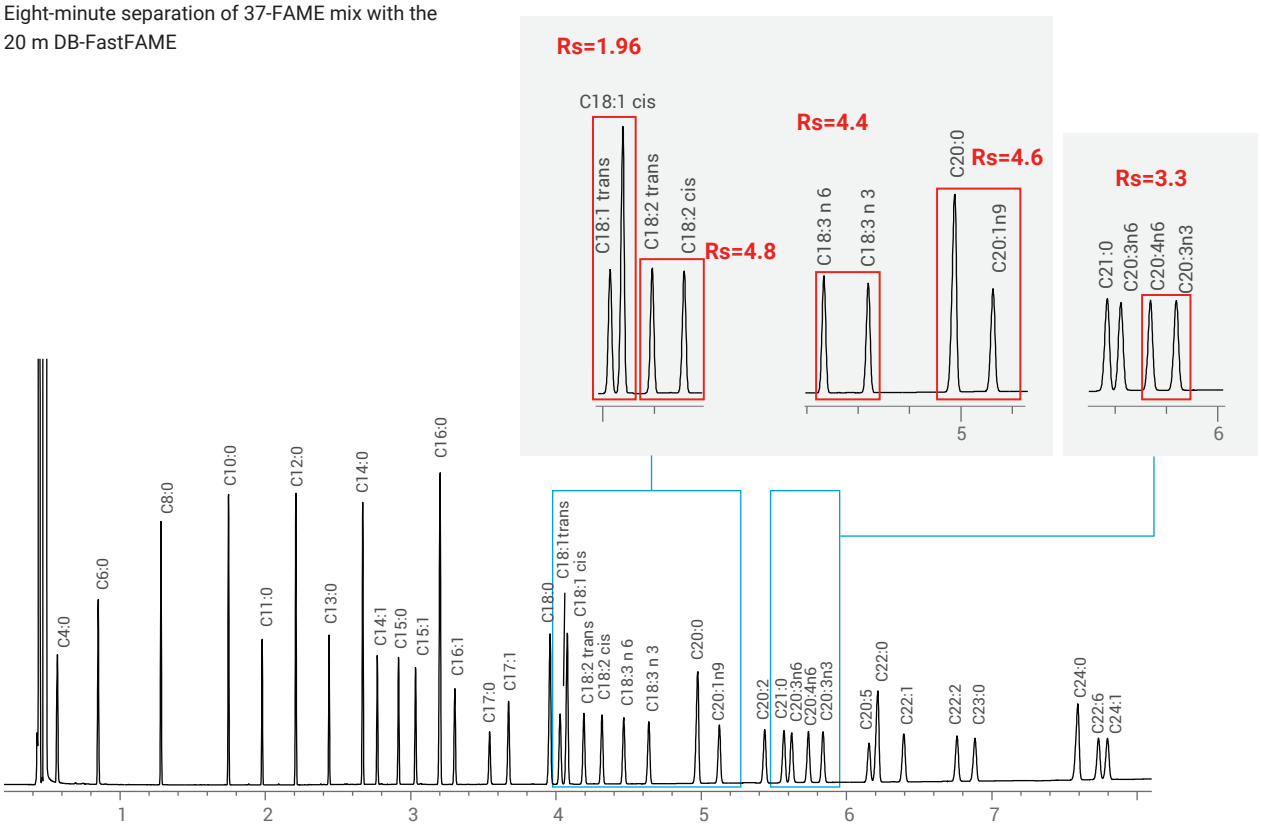
Agilent J&W DB-FastFAME: Fast separation of FAMEs

DB-FastFAME is a mid-content cyanopropyl column that is slightly less polar than high-content cyanopropyl columns, such as HP-88 and CP-Sil 88 for FAME. However, it has similar intermolecular forces, keeping similar interactions between the stationary phase and analytes. With DB-FastFAME, it is possible to reduce analysis time, with good resolution even for challenging cis-trans FAME isomers.

Resolve saturated/unsaturated FAMEs, including key cis-trans isomers, in under eight minutes

In this chromatogram, we show the separation of a typical mix of nutrition-labeling FAMEs in under eight minutes. These include C18:1 and C18:2 pairs, and popular FAMEs commonly found in milk fat, vegetable oil, and fish oil, including DPA and EPA.

Eight-minute separation of 37-FAME mix with the 20 m DB-FastFAME



Separation of most food nutrition-labeling FAMEs in under 8 minutes. Completely resolve AOCS and AOAC critical pairs. For details, see technical note **5991-8706EN**: *Improving the Analysis of 37 Fatty Acid Methyl Esters.*

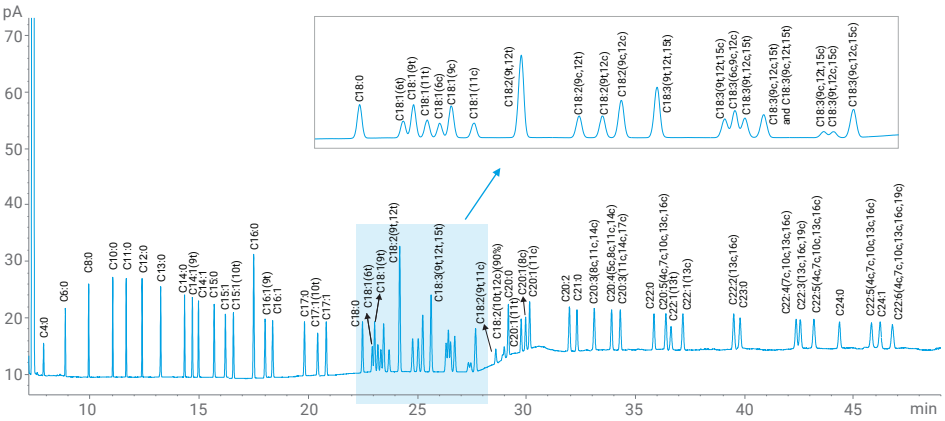
Conditions:

GC system:	Agilent 7890B
Column:	DB-FastFAME, 20 m x 0.18 mm, 0.20 µm (p/n G3903-63010)
Inlet:	250 °C, split/splitless mode, split ratio 50:1
Carrier:	Hydrogen, constant pressure, 28 psi
Oven:	80 °C (0.5 min), 65 °C/min to 175 °C, 10 °C/min to 185 °C (0.5 min), 7 °C/min to 230 °C
FID:	260 °C, Hydrogen: 40 mL/min, Air: 400 mL/min, make-up gas: 25 mL/min
Injection:	1 µL
Sample:	37-FAME Mix

New high-resolution 90 m and 60 m DB-FastFAME for the separation of positional cis-trans isomers

The longer DB-FastFAME GC columns provide the necessary selectivity with the advantage of very fast separations to resolve all critical fatty acids as FAMEs. The 90 m DB-FastFAME can effectively separate a 63-component FAME mixture, including several C18:1, C18:2, and C18:3 cis-trans positional isomers within 48 minutes. Challenging positional isomers, including the C18:1 11*t* and C18:1 6*c* critical pair, can be baseline resolved (R_s = 1.4).

Fast separation of FAMEs including positional cis-trans isomer with the 90 m DB-FastFAME

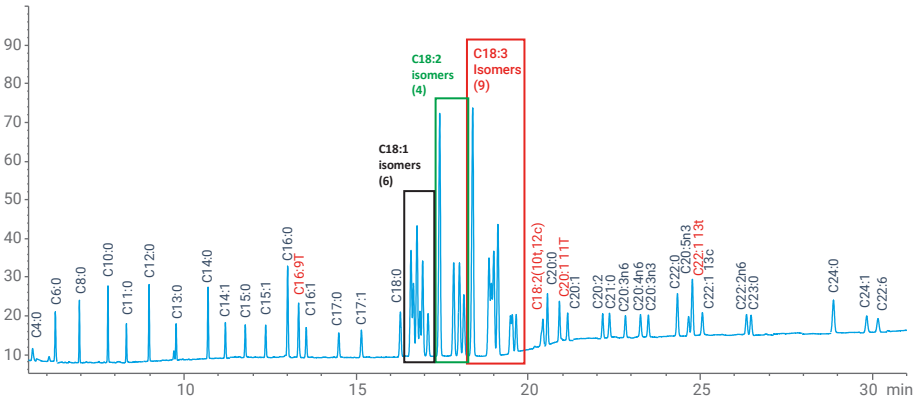


Analysis of 63-component FAMEs standard mixture using new 90 m DB-FastFAME.

Conditions:

GC system:	Agilent 8890
Column:	DB-FastFAME, 90 m x 0.25 mm i.d., 0.25 µm (p/n G3903-63013Z, s/n T009721Z)
Inlet:	260 °C, split/splitless mode, split ratio 30:1
Carrier:	Helium, constant pressure 44 psi
Oven:	75 °C (1 min), 35 °C/min to 200 °C (14 min), 2.5 °C/min to 210 °C (5 min), 12 °C/min to 230 °C (20 min)
FID:	260 °C, Hydrogen: 30 mL/min, Air: 300 mL/min, make-up gas: 25 mL/min
Injection:	1 µL

Speed up the analysis time with the Intuvo 9000 GC system

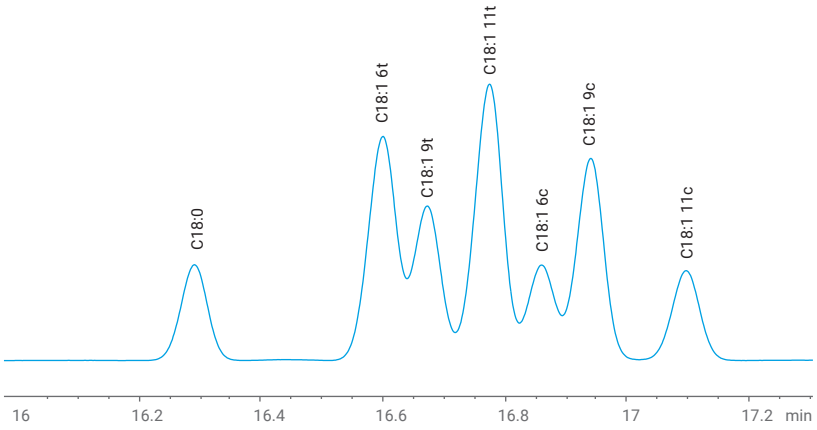


GC/FID chromatogram of a 54-FAME mix, including the 37-FAME mix and some trans-FAMEs.

Conditions:

GC system:	Agilent Intuvo GC/FID
Column:	DB-FastFAME Intuvo GC column, 60 m x 0.25 mm i.d., 0.25 µm (p/n G3909-63007)
Inlet:	260 °C, split/splitless mode, split ratio 100:1
Guard chip:	200 °C
Carrier:	Helium, constant pressure, 30 psi
Oven:	70 °C (1 min), 200 °C/min to 175 °C (2 min), 5 °C/min to 210 °C (8 min), 15 °C/min to 240 °C (15 min)
FID:	260 °C, Hydrogen: 40 mL/min, Air: 400 mL/min, make-up gas: 25 mL/min
Injection:	1 µL

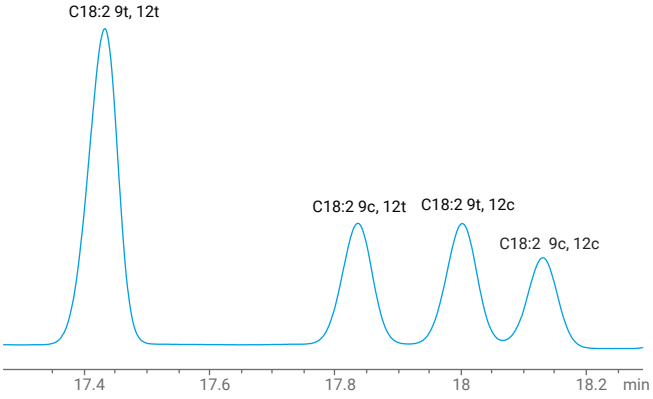
Expanded view of C18:1 cis-trans isomers



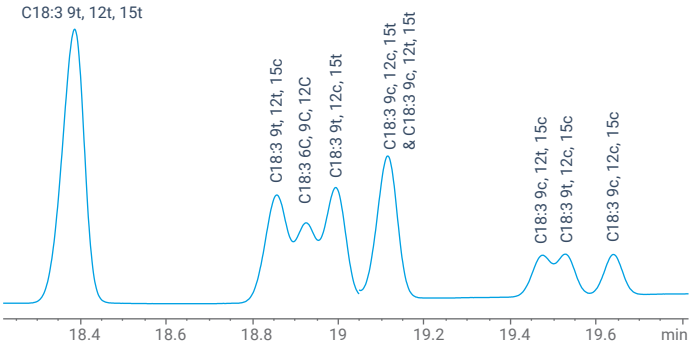
Trans-FAMEs included:

1. C18:3 9t,12t,15t
2. C18:3 9t,12t,15c
3. C18:3 9t,12c,15t
4. C18:3 9c,12c15t
5. C18:3 9c,12t,15t
6. C18:3 9c,12t,15c
7. C18:3 9t,12c,15c
8. C18:2 9t,12c
9. C18:2 9t,12t
10. C18:2 9c,12t
11. C18:2 10t,12c
12. C18:1 6t
13. C18:1 9t
14. C18:1 11t
15. C22:1 13t
16. C20:1 11t
17. C16:1 9t

Expanded view of C18:2 cis-trans isomers



Expanded view of C18:3 cis-trans isomers



Agilent Intuvo 9000 GC system

The Intuvo offers ultrafast gas chromatography while simplifying your laboratory workflow. Eliminate column maintenance and change columns in less than a minute with Intuvo's click-and-run connections. Faster cycle times through ballistic direct-heating ensure reproducible chromatography and allow for higher throughput in the laboratory. Intuvo's built-in intelligence reduces operational and maintenance costs through its self-guided diagnostic troubleshooting and early maintenance feedback. Agilent Smart Keys will identify the exact instrument configuration and column parameters to reduce user error.

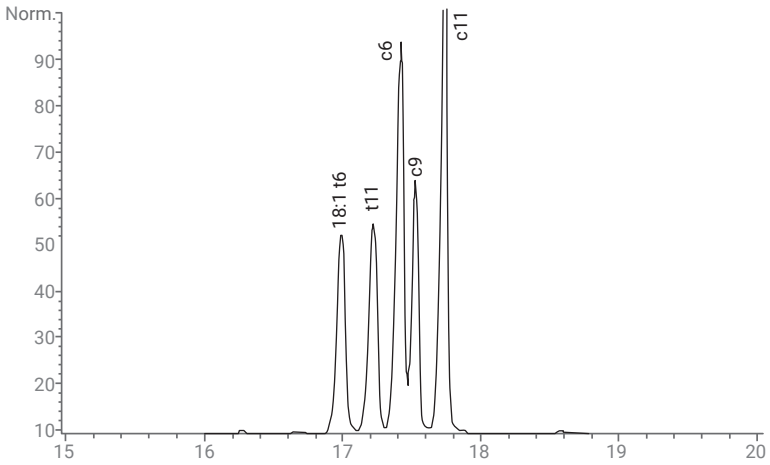
For more information, please visit the **Intuvo product page**.

Agilent J&W CP-Sil 88 for FAME and HP-88: Analysis of positional geometric FAME isomers

Our most comprehensive choice for FAMEs

CP-Sil 88 for FAME and HP-88 are your best column choices for detailed analysis of positional cis-trans FAME isomers in the C6-C26 range. These high-cyanopropyl phases are optimized for cis-trans isomers separation and are ideal for the most challenging FAMEs applications, including partially hydrogenated oils (PHVO) and conjugated linoleic acids. These columns are also recommended for many AOCS and AOAC methods, including AOAC 996.06 and AOCS Ce 1j-07.

Analysis of five C18:1 isomers

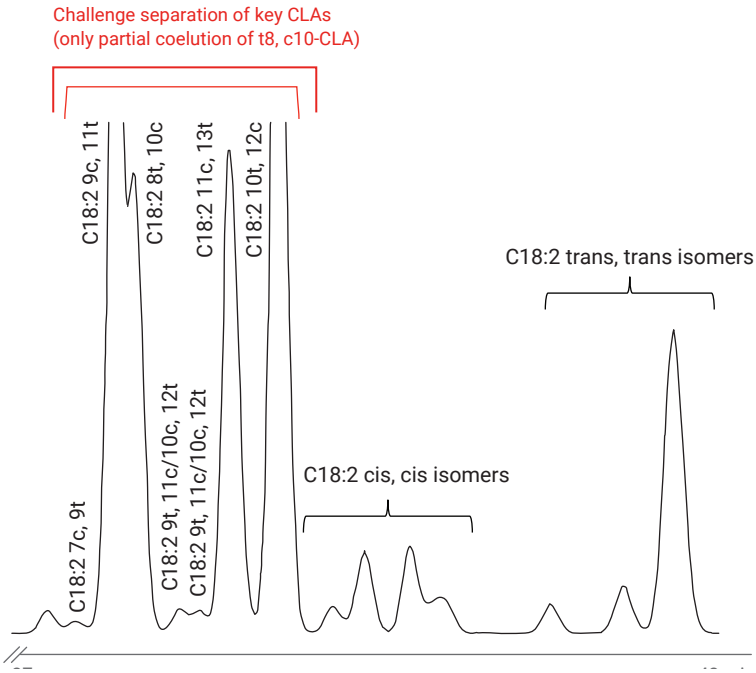


Gas chromatography using an Agilent HP-88 column separated 16 FAMEs of conjugated linoleic acids in soya bean oil in 50 minutes.

Conditions:

GC system:	Agilent 6890
Column:	HP-88, 100 m x 0.25 mm, 0.2 µm (p/n 112-88A7)
Inlet:	250 °C, split/splitless mode, split ratio 50:1, split liner (p/n 5183-4647)
Carrier:	Hydrogen, constant flow, 2 mL/min
Oven:	120 °C (1 min), 10 °C/min to 175 °C (10 min), 5 °C/min to 210 °C (5 min), 5 °C/min to 230 °C (5 min)
FID:	280 °C
Injection:	1 µL

Analysis of C18:2 conjugated FAME isomers of linoleic acid (CLA)



Ideal column of choice for separating and quantitating CLA isomers in complex mixtures.

Conditions:

GC system:	Agilent 6890
Column:	CP-Sil 88 for FAME, 100 m x 0.25 mm, 0.2 µm (p/n CP7489)
Inlet:	260 °C, split mode
Carrier:	Helium, 30 psi
Oven:	170 °C
FID:	260 °C
Injection:	0.5 µL
Sample:	Approx 2% of each FAME in TBME

Courtesy: Dr. Dahlke, Hamburger Fettchemie
Brinckman & Mergell, GmbH

Select FAME: Most detailed FAME analysis with complementary selectivity to CP-Sil 88 for FAME/HP-88 phases

Select FAME columns provide complementary selectivity to CP-Sil 88 and HP-88 GC columns—making them ideal for the detailed analysis of positional cis-trans isomers. What's more, Select FAME columns are tuned for optimal cis-trans FAME analysis, especially for C18 isomers.

These low-bleed, bonded columns have an isothermal maximum operating temperature of 275 ºC and a programmed temperature of 290 ºC. That's an improvement of 50 ºC, compared to nonbonded columns—and makes Select FAME columns suitable for GC/MS applications. You also get three times greater loadability, further improving shape and separation for FAME isomers. Columns up to 200 m are available for detailed analysis of the C18:1 isomer cluster.

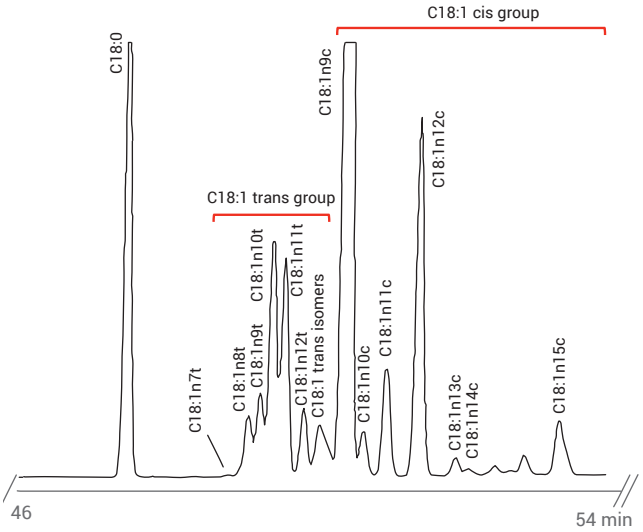
Your column of choice for the most detailed analysis of positional cis-trans FAMEs

For separating individual FAME trans isomers, the highest separation efficiency is required. A 200 m column was used for this application, and many trans fatty acids were individually quantified. The CP-Select CB column is stable up to 290 °C.

Conditions:

GC system:	Agilent 7890B
Column:	Select FAME, 200 m x 0.25 mm (p/n CP7421)
Inlet:	250 °C, split mode, split ratio 1:20
Carrier:	Helium, 520 kPa
Oven:	185 °C
FID:	250 °C
Injection:	0.5 µL

Detailed analysis of cis-trans FAMEs C18:1 positional isomers



Column of choice for the most detailed analysis of positional cis-trans FAMEs.

Separation of 20 cis-trans isomers in 17 minutes

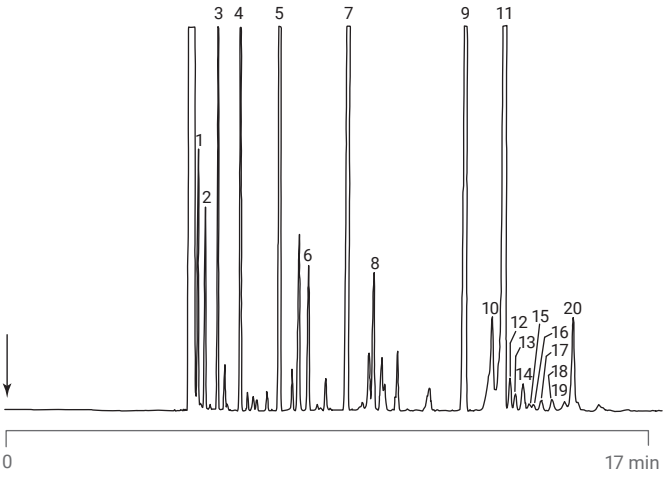
One characteristic of Select FAME columns is high loadability, which enables better separations for FAME isomers eluting closely together. Column bleed is also low, providing excellent quantification for trace compounds—especially with sensitive MS detectors.

Conditions:

GC system:	Agilent 7890B
Technique:	GC-capillary
Column:	Select FAME, 50 m x 0.25 mm, 0.25 µm (p/n CP7419)
Inlet:	Split, 1:100, T = 250 °C
Carrier:	Helium, 130 kPa (1.3 bar, 19 psi)
Oven:	185 °C
FID:	250 °C
Injection:	1 µL
Sample:	Butter (methyl esters)

1. C16:0
2. C8:0
3. C10:0
4. C12:0
5. C14:0
6. C14:1
7. C16:0
8. C16:1 9 cis
9. C18:0
10. C18:1 trans
11. C18:1 9 cis
12. C18:1 11 cis
13. C18:1 12 cis
14. C18:1 13 cis
15. C18:1 14 cis
16. C18:1 15 cis
17. C18:2 9 trans, 12 trans
18. C18:2 9 cis, 12 trans
19. C18:2 9 trans, 12 cis
20. C18:2 9 cis, 12 cis

Fast analysis of cis-trans geometrical isomers in butter



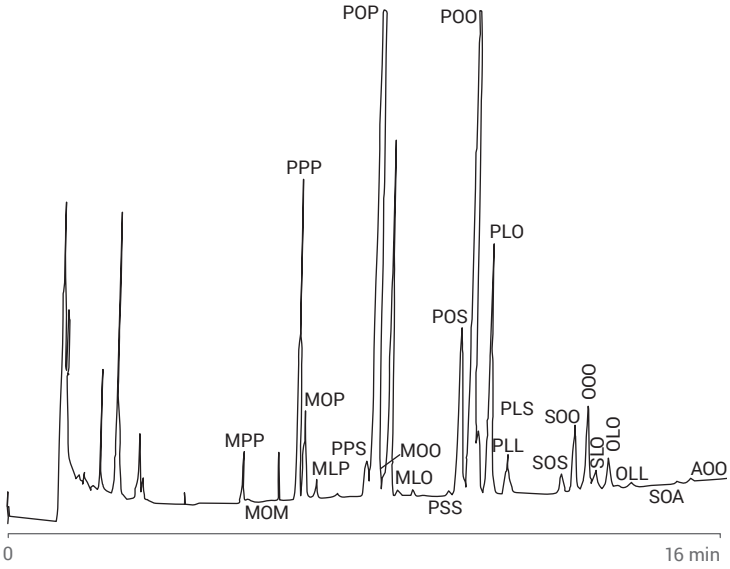
Twenty cis-trans isomers were separated in 17 minutes. One characteristic of Select FAME columns is high loadability, which enables better separations for FAME isomers eluting closely together.

CP-TAP CB for Triglycerides/Chromspher Lipids: Complementary techniques for triglyceride analysis

CP-TAP CB for Triglycerides columns for GC analysis

CP-TAP CB for Triglycerides is a highly-phenyl substituted phase, specifically engineered for detailed analysis of triglycerides, and provides resolution depending on carbon number, and according to the degree of unsaturation to give a more refined separation. This bonded phase exhibits low bleed and provides longer column lifetimes. CP-TAP CB is available in a special fused silica tubing for maximum column strength at temperatures up to 360 ºC, or UltiMetal stainless steel capillary for ultimate robustness.

Triglycerides in palm oil

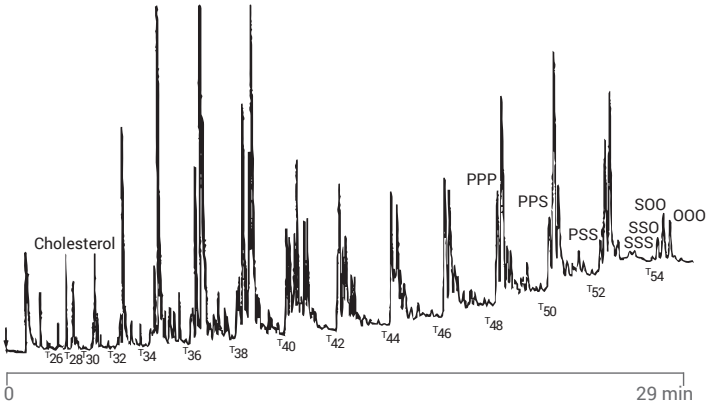


Separation of 24 C_{46} to C_{56} triglycerides in palm oil under 16 minutes using Agilent J&W CP-TAP CB for Triglycerides.

Conditions:

GC system:	Agilent 7890B
Technique:	GC-capillary
Column:	CP-TAP CB for Triglycerides, 25 m x 0.25 mm, 0.10 µm (p/n CP7483)
Temperature:	340 °C (1 min) to 355 °C, 1 °C/min
Carrier:	H_2, 100 kPa (1 bar, 15 psi)
Injector:	On-column
Injection:	0.2 µL of 0.05% palm oil in hexane
Detector:	FID
Sample size:	0.2 µL
Concentration range:	0.05% palm oil in hexane

Triglycerides and cholesterol in butter fat



Separation of 11 butter fat components in 29 minutes using CP-TAP CB for Triglycerides.

Conditions:

GC system:	Agilent 7890B
Technique:	GC-capillary
Column:	CP-TAP CB for Triglycerides, 25 m x 0.25 mm, 0.10 µm (p/n CP7483)
Temperature:	280 °C (1 min) to 355 °C, 3 °C/min
Carrier:	H_2, 100 kPa (1 bar, 15 psi)
Injector:	On-column
Injection:	0.2 µL of 0.05% butter fat in hexane
Detector:	FID

M :	Myristic acid (tetradecanoic acid)	C14: 0
P :	Palmitic acid (hexadecanoic acid)	C16: 0
O :	Oleic acid (cis-9-octadecanoic acid)	C18: 1
L :	Linoleic acid (cis,cis-9,12,octadecadienoic acid)	C18: 2
S :	Stearic acid (octadecanoic acid)	C18: 0
A :	Arachidic acid (eicosanoic acid)	C20: 0

ChromSpher Lipids columns for HPLC analysis

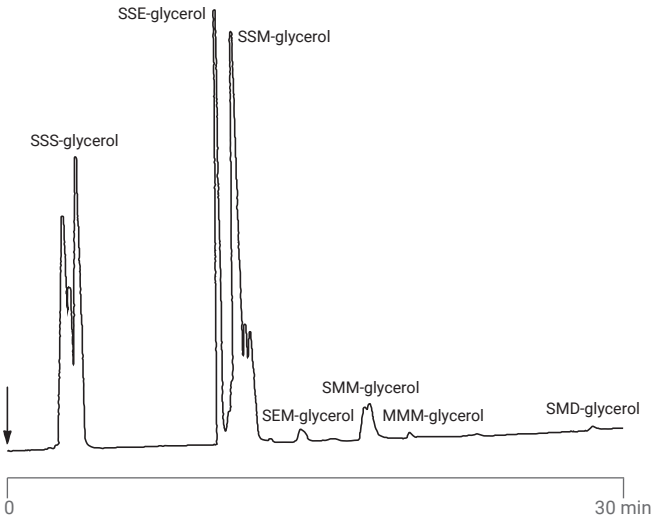
ChromSpher Lipid columns are LC columns packed with a cation exchange resin in the Ag+ ionic form. It is specifically designed for the analysis of triglycerides. This column is the ideal complement to CP-TAP CB for Trigylceride analysis, or to CP-Sil 88 for FAME analysis, and is commonly used for quality control in vegetable oil and dairy products.

Did you know?

The position of palmitate in triacylglycerols can influence health benefits in infant formulas.

– Nutrition Research, 44, 1-8, 2017

Analysis of triglycerides in milk fat



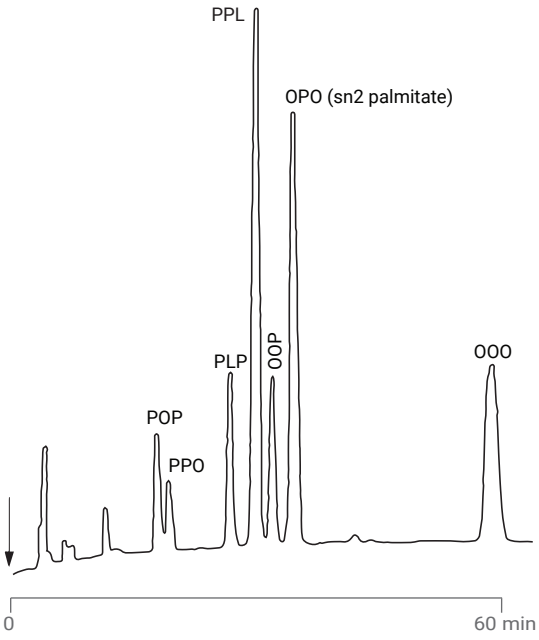
Conditions:

Technique:	HPLC
Column:	ChromSpher Lipids 250 x 4.6 mm conventional stainless steel, Cat.no. 28313
Mobile phase:	A: dichloromethane/dichloroethane – 50/50 (v/v) B: acetone
Gradient:	t=0 to t=3 min 100% A T=3 to t=45 min 100% A to 50% A/50% B
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detector:	Light Scattering Detector ACS
Sample size:	20 µL
Concentration range:	0.1 g/mL
Solvent sample:	Dicholoroethane

S: Saturated chain
M: Mono-ene-chain
D: Di-ene-chain1
E: Elaidic acid

Courtesy: Dr. Deffense,
Fractionnement TIRTIAUX,
Fleurus, Belgium

Analysis of triglyceride positional isomers



The most efficient and reliable method for the separation and quantification of 1,3-dioleoyl-2-palmitoylgycerol (OPO) in infant formulas and OPO oils.

Conditions:

Column:	ChromSpher 5 Lipids, 250 x 4.6 mm i.d. (p/n 28313) x 2
Mobile phase:	0.5% acetonitrile in hexane
Flow rate:	1.0 mL/min
Temperature:	21 °C
Detector:	UV detector, 206 nm
Sample size:	12 µg on the column
Concentration range:	12 mg/mL
Solvent sample:	Isooctane

P: Palmitic acid (hexadecanoic acid)
L: Linoleic acid (cis, cis-9,12,octadecadienoic acid)
O: Oleic acid (cis-9-octadecenoic acid)

Courtesy: R. O. Adlof, US Department of Agriculture,
National Centre for Agricultural Utilization Research,
Peoria, Illinois, USA

Ref: HRC 18 (1995) 105-107

Selecting the right column for your samples

Column selection by type of fatty acid

Type of Fatty Acid	CP-FFAP CB	DB-FATWAX UI	DB-FastFAME	CP-Sil 88 for FAME/HP-88	Select FAME	CP-TAP CB for Triglycerides	ChromSpher Lipids (LC)
Short-chain free fatty acids (C2-C6)	●	●					
Medium-chain free fatty acids (C6-C16)	●	●					
Long-chain free fatty acids (C16-C24)	●						
Omega 3 & 6 FAMEs		●	●	●	●		
FAMEs by degree of saturation		●					
FAMEs groups of cis and trans isomers			●	●	●		
FAMEs geometrical positional isomers			●	●	●		
Cholesterol and triglycerides						●	●

Column selection by type of food

Type of Food	CP-FFAP CB	DB-FATWAX UI	DB-FastFAME	CP-Sil 88 for FAME/HP-88	Select FAME	CP-TAP CB for Triglycerides	ChromSpher Lipids (LC)
Dairy products (e.g., milk, butter, cheese)	●	●	●	●	●	●	●
Fish oil		●	●	●	●	●	●
Animal fat		●	●	●	●	●	●
Omega 3 and 6		●	●	●	●		
Vegetable oils (e.g., canola, soybean, olive, palm, corn)			●	●	●	●	●
Refined (hydrogenated) oil (e.g., deep-fried foods, baked goods)			●	●	●		
Margarines and shortenings			●	●	●	●	●

Faster Slower

GC columns

Description	Part No.
DB-FATWAX UI	
20 m x 0.18 mm, 0.18 µm	G3903-63007
30 m x 0.25 mm, 0.25 µm	G3903-63008
30 m x 0.32 mm, 0.25 µm	G3903-63009
20 m x 0.18 mm, 0.18 µm, Intuvo	G3909-63002
30 m x 0.25 mm, 0.25 µm, Intuvo	G3909-63003
30 m x 0.32 mm, 0.25 µm, Intuvo	G3909-63004
DB-FastFAME	
20 m x 0.18 mm x 0.20 µm	G3903-63010
30 m x 0.25 mm x 0.25 µm	G3903-63011
20 m x 0.18 mm x 0.20 µm, Intuvo	G3909-63005
30 m x 0.25mm x 0.25 µm, Intuvo	G3909-63006
60 m x 0.25 mm x 0.25 µm	G3903-63012
60 m x 0.25 mm x 0.25 µm, Intuvo	G3909-63007
90 m x 0.25 mm x 0.25 µm	G3903-63013
CP-Sil 88 for FAME	
50 m x 0.25 mm x 0.2 µm	CP7488
60 m x 0.25 mm x 0.2 µm	CP7487
100 m x 0.25 mm x 0.2 µm	CP7489
HP-88	
30 m x 0.25 mm x 0.2 µm	112-8837
30 m x 0.25 mm x 0.2 µm, 5" cage	112-8837E
60 m x 0.25 mm x 0.2 µm	112-8867
60 m x 0.25 mm x 0.2 µm, 5" cage	112-8867E
100 m x 0.25 mm x 0.2 µm	112-88A7
100 m x 0.25 mm x 0.2 µm, 5" cage	112-88A7E
60 m x 0.25 mm x 0.2 µm, Intuvo	112-8867-INT
Select FAME	
50 m x 0.25 mm	CP7419
100 m x 0.25 mm	CP7420
200 m x 0.25 mm	CP7421
50 m x 0.25 mm, 5" cage	CP7419I5
CP-TAP CB for Triglycerides	
25 m x 0.25 mm x 0.1 µm, UltiMetal	CP7463
25 m x 0.25 mm x 0.1 µm	CP7483

LC columns

Description	Part No.
ChromSpher Lipids (LC)	
30 mm x 4.6 mm x 5.0 µm	G7601-85000
50 mm x 4.6 mm x 5.0 µm	G7601-85001
250 mm x 4.6 mm x 5.0 µm	CP28313
250 mm x 10.0 mm x 5.0 µm	CP28509

A Complete GC Workflow: Improve User Experience, Lab Operations, and Business Success

Agilent intelligent GC systems

Spend more time on what matters

Instruments in the Agilent GC portfolio aren't just smart, they're insightful. They go beyond collecting system information to help you increase productivity, minimize downtime, and improve efficiency. That means you can keep your lab moving toward a successful future.

Learn more at **www.agilent.com/chem/smartgc**

Agilent J&W GC capillary columns

Count on consistent performance and reliability

- Ensure a leak-free, inert flow path for optimal signal-to-noise performance.
- Deliver the lowest bleed levels, highest inertness, and tightest column-to-column reproducibility.
- Include Smart Keys that provide information on column use, configuration, age, temperature, and number of injections. Default parameters facilitate configuration.

Learn more at **www.agilent.com/chem/gccolumns**

Agilent J&W GC supplies

Improve scientific outcomes

Our precision-engineered GC supplies, including ferrules, nuts, tubing, inlet liners, syringes, and septa, ensure reproducible results and dependable performance.

Learn more at **www.agilent.com/chem/gcsupplies**

Agilent sample preparation solutions

Reliably extract and concentrate samples from complex matrices

Simplify sample preparation with prepackaged Agilent Bond Elut QuEChERS kits

- Extraction kits with preweighed salts in anhydrous packets let you add salts after the organic solvent—avoiding exothermic reactions.
- Dispersive kits accommodate the aliquot volumes specified by current AOAC and EN methodologies.
- Ceramic homogenizers break up salt agglomerates, promoting consistent sample extraction and increasing recovery.

Produce cleaner extracts using Agilent Bond Elut SPE

- A selection of polymer, silica, and other sorbents are available in formats ranging from multiple cartridge sizes to 96-well plates.
- Consistent particle size ensures superior flowthrough and performance.
- Vacuum manifolds and accessories help you meet all your SPE challenges.

Learn more at **www.agilent.com/chem/sampleprep**

Agilent CrossLab services. From insight to outcome.

CrossLab is an Agilent capability that integrates services and consumables to support workflow success and important outcomes like improved productivity and operational efficiency. Through CrossLab, Agilent strives to provide insight in every interaction to help you achieve your goals. CrossLab offers method optimization, flexible service plans, and training for all skill levels. We have many other products and services to help you manage your instruments and your lab for best performance.

Learn more about Agilent CrossLab, and see examples of insight that leads to great outcomes, at **www.agilent.com/crosslab**

Learn more:
www.agilent.com/chem/db-fastfame
www.agilent.com/chem/fatwax-ui

Buy online:
www.agilent.com/chem/store

Contact us:
www.agilent.com/chem/contactus

U.S. and Canada
1-800-227-9770
agilent_inquiries@agilent.com

Europe
info_agilent@agilent.com

Asia Pacific
inquiry_lsca@agilent.com

Published in the USA, January 30, 2020
5991-8763EN
DE.6237731481

Agilent
Trusted Answers