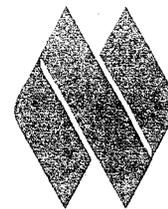


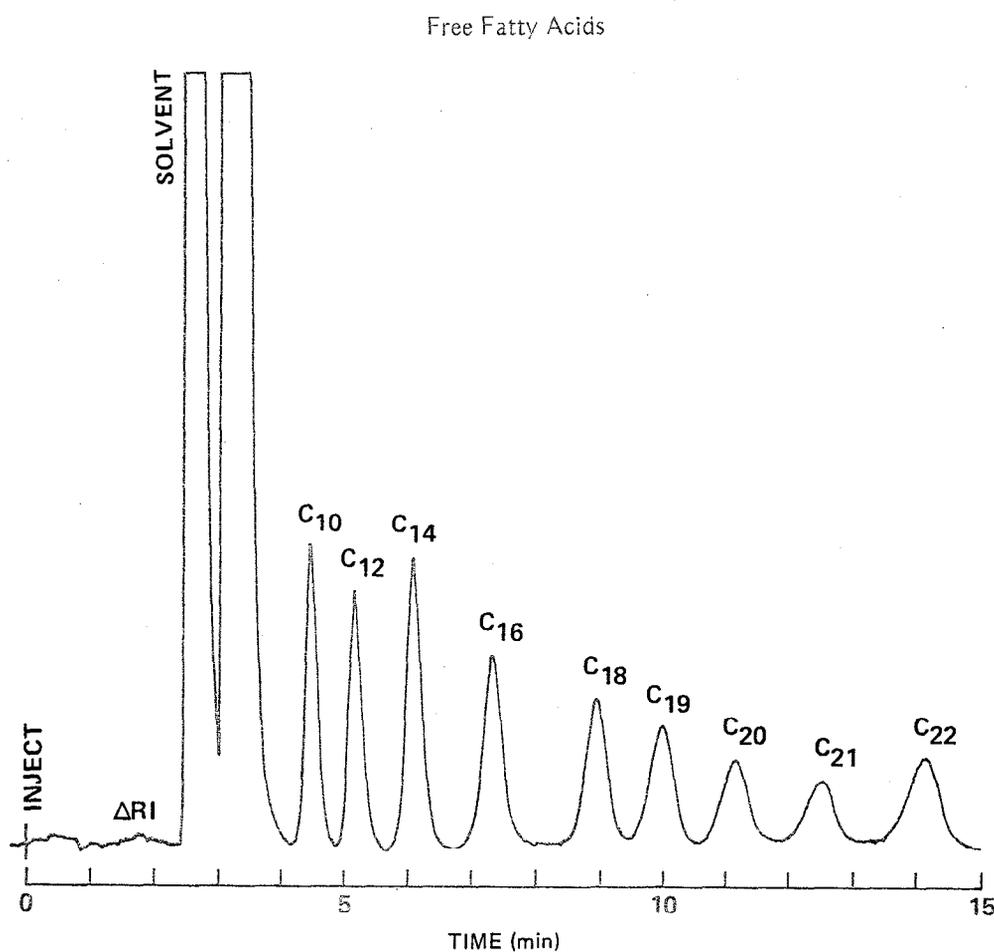
Fatty Acid Analysis without derivative formation



Free fatty acids, fatty alcohols, and some fatty amides can now be analyzed *without* forming volatile derivatives. Derivative formation, necessary in GC analysis, adds an extra step not necessary in liquid chromatography, and the consistency of data from GC is, to an extent, subject to lot-to-lot variations in the derivativizing reagents.

With direct analysis using Waters' Fatty Acid Analysis Column, the possibility of incomplete conversion is eliminated and presents no difficulty in final quantitation. Furthermore, room-temperature operation of the LC eliminates the risk of oxidizing the unsaturated fatty acids or causing similar reactions which can occur at the high temperatures needed for GC.

By providing rapid, room-temperature separations of the "real" sample — not its derivatives — Waters' specialized Fatty Acid Analysis Column enables straightforward sample preparation and permits greater ease of analysis and increased accuracy. The following examples highlight the advantages of this column.



COLUMN: Fatty Acid Analysis
4 mm x 30 cm

FLOW RATE: 1 ml/min

DETECTOR: RI:4X

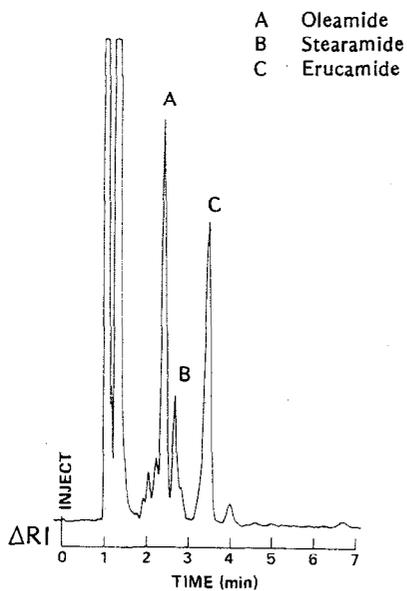
INSTRUMENT: ALC/GPC 244

This separation of standards is typical of the results obtainable with Waters' Fatty Acid Analysis Column.

Quality Control of Raw and Finished Materials

A quality control method must be fast, easy-to-use, and must reliably differentiate between acceptable and nonacceptable materials. Waters' Fatty Acid Analysis Column provides an ideal means for quality control analyses of long-chain fatty acids. For example, batches of tall oil fatty acids were quickly checked to determine differences. Total analysis time — including sample preparation — took only 20 minutes! Fatty alcohols and fatty amides can be handled with equal ease for routine analysis.

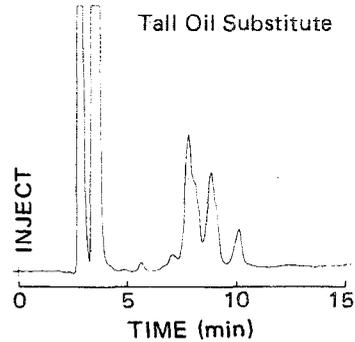
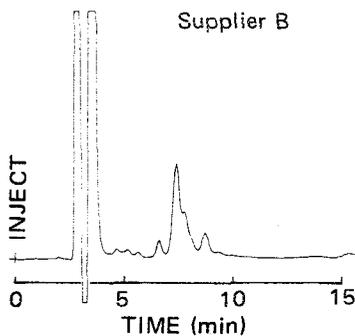
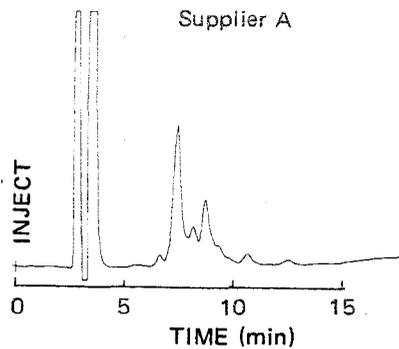
Fatty Amides



COLUMN: Fatty Acid Analysis
4 mm x 30 cm
FLOW RATE: 3.0 ml/min
DETECTOR: RI: 4X
INSTRUMENT: ALC/GPC 244

Fatty amides are used as slip agents in polymer films. Because LC analysis of these materials requires less than five minutes, it may be used as a quality control procedure for incoming materials and for evaluation of off-spec or competitive films.

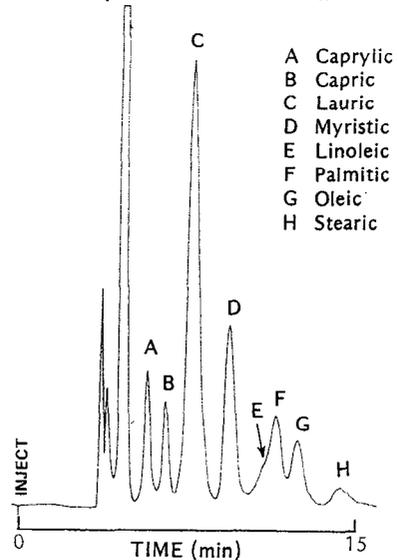
Tall Oil Fatty Acids



COLUMN: Fatty Acid Analysis
4 mm x 30 cm
FLOW RATE: 1.0 ml/min
DETECTOR: RI: 8X
INSTRUMENT: ALC/GPC 244

Tall oils are used in the manufacture of soaps, coatings, and oils. With Waters' Fatty Acid Analysis Column, fatty acid tall oils from different suppliers and tall oil substitutes can be quickly compared and quality control specifications set on incoming material.

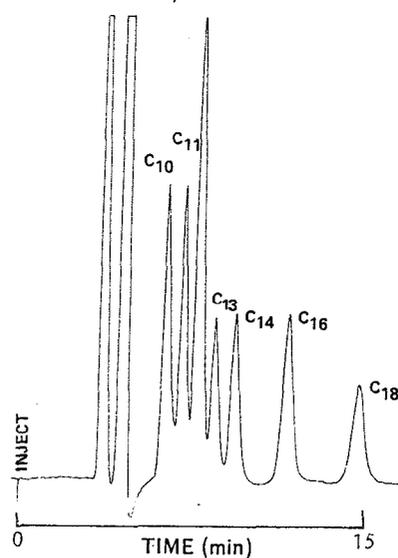
Saponified Coconut Oil



COLUMN: Fatty Acid Analysis
4 mm x 30 cm
DETECTOR: RI: 4X
INSTRUMENT: ALC/GPC 201
Collaborative work with Dr. J. King
Virginia Commonwealth University

With the Fatty Acid Analysis Column, final products, such as this saponified coconut oil can also be quickly analyzed.

Fatty Alcohols



COLUMN: Fatty Acid Analysis
4 mm x 30 cm
TEMPERATURE: Ambient
FLOW RATE: 1.0 ml/min
DETECTOR: RI: 4X
INSTRUMENT: ALC/GPC 201

This separation of fatty alcohols would be very difficult to accomplish by GC because of excessive tailing and peak broadening.

Analysis of Total Sample

Whenever a derivative must be formed prior to analysis, the possibility always arises that some sample components will not form derivatives and will be overlooked in the analysis. By eliminating sample derivatives, the Fatty Acid Analysis Column analyzes all components in a mixture, including polymeric and oxidized compounds.

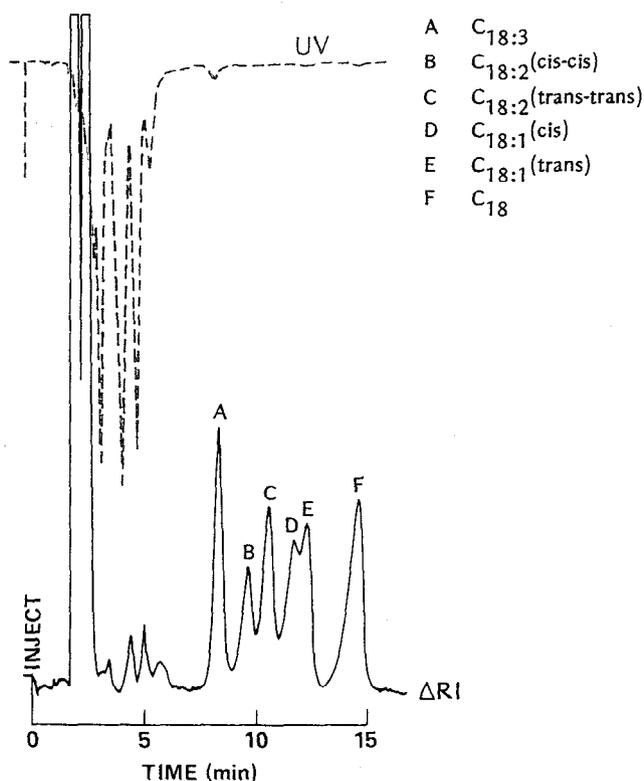
The complementary benefit of LC with respect to GC is illustrated by the separation of the C₁₈ isomers. According to a GC analysis, the only compounds

present were the isomers themselves and their separation on GC was not good. However, the LC analysis shows several UV-absorbing compounds eluting early in the chromatogram. These compounds are most probably oxidation products from the standard samples. Also, note the relative ease with which the geometric isomers are separated.

Monitor Esterification Reactions

Liquid chromatography has been used for years to monitor many types of reactions. Waters' Fatty Acid Analysis Column extends the applications range of LC to cover esterification reactions of fatty acids and alcohols. LC can determine which reaction conditions produce the highest yield or how quickly the reaction can be terminated.

C₁₈ Fatty Acid Isomers



COLUMN: Fatty Acid Analysis
4 mm x 30 cm

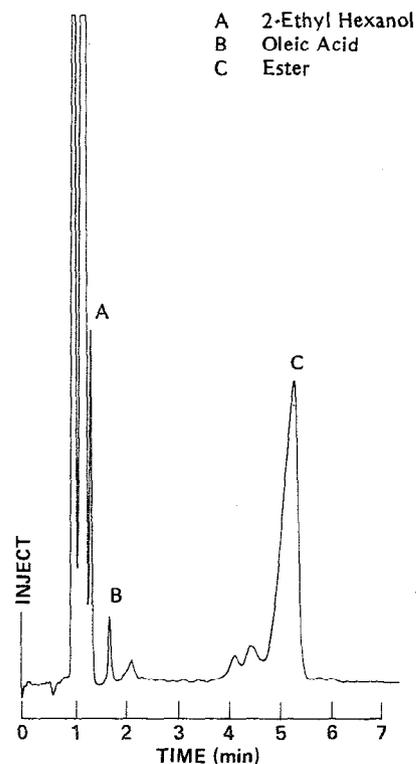
FLOW RATE: 2.0 ml/min

DETECTOR: RI: 4X
UV: 1.0 AUFS

INSTRUMENT: ALC/GPC 244

The Waters' Liquid Chromatograph used in this analysis contains both a UV detector and a differential refractometer. This provides the most information about the sample. Note the presence of early-eluting UV-absorbers, probably oxidation products.

Reaction Mixture 2-Ethyl Hexanol + Oleic Acid → Ester



COLUMN: Fatty Acid Analysis
4 mm x 30 cm

FLOW RATE: 3.0 ml/min

DETECTOR: RI: 4X

INSTRUMENT: ALC/GPC 244

Injecting aliquots of the reaction mixture at different times allows reaction kinetics to be determined by measuring the disappearance of alcohol and acid and the increase in ester concentration.

Preparative Purification for Further Identification

A major advantage of liquid chromatography is the ease of sample collection and recovery. Purified material from the liquid chromatograph can be used for further testing. The chromatograph can also serve as an initial clean-up tool. Crude meat or fat extracts, for example, can be partially purified using the Fatty Acid Analysis Column, fractions collected, and those fractions further purified by chromatographic means.

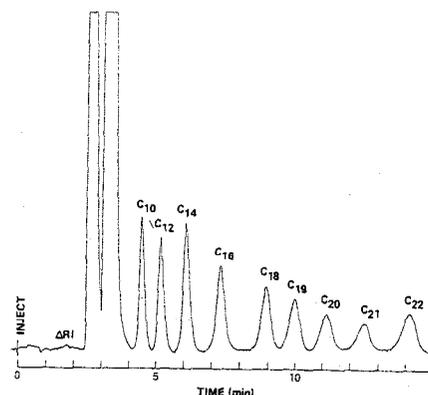
Detecting the Free Fatty Acids

The ability to detect non-UV-absorbing fatty acids is dependent on the use of Waters' differential refractometer to monitor the separation. This universal detector measures the difference in refractive index between the sample and the solvent. When sample size is not limited, larger volume injections are easily accommodated with this detector.

Pretested Column — Guaranteed Results

Waters' Fatty Acid Analysis Columns must meet seven stringent quality control tests before shipment. Among these tests is a chromatographic separation of nine free fatty acids, equivalent to the separation shown. These quality control procedures allow Waters to guarantee results with proper usage of the columns.

Fatty Acids



COLUMN: Fatty Acid Analysis
4 mm x 30 cm
DETECTOR: RI: 4X
INSTRUMENT: ALC/GPC 244

This rapid separation of fatty acid standards is one of the quality control tests which must be met by Waters' Fatty Acid Analysis Column before shipment.

Ordering Information

For the Fatty Acid Analysis Column

Column Dimension
4 mm ID x 30 cm

Catalog No.
27196

Price
\$350.00



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