Application Note 20669

Analysis of Fatty Acid Methyl Esters (FAMEs) C8–C24 by FID Using a Metal Column

Peter Morgan, Thermo Fisher Scientific, Runcorn, Cheshire, UK

Key Words
TG-WaxMT, FAME, fatty acid methyl esters

Abstract
Fatty acid methyl ester (FAME) analysis is performed for a number of reasons, from measuring the fat content of foods to determining the constituents of biodiesel. Due to the high-throughput nature of many of these tests, improvement in column lifetime and robustness is desirable.

Thermo Scientific™ TraceGOLD™ Metal GC columns provide a robust alternative to the traditional fused silica column. Metal columns give equivalent selectivity to a fused silica column for the separation of FAMEs.

Introduction
TraceGOLD Metal columns aim to increase the lifetime of the GC column without altering the selectivity. This is achieved by using a metal capillary instead of the conventional fused silica column with the same stationary phase. This results in a capillary column that is more physically robust but with the same stationary phase selectivity.

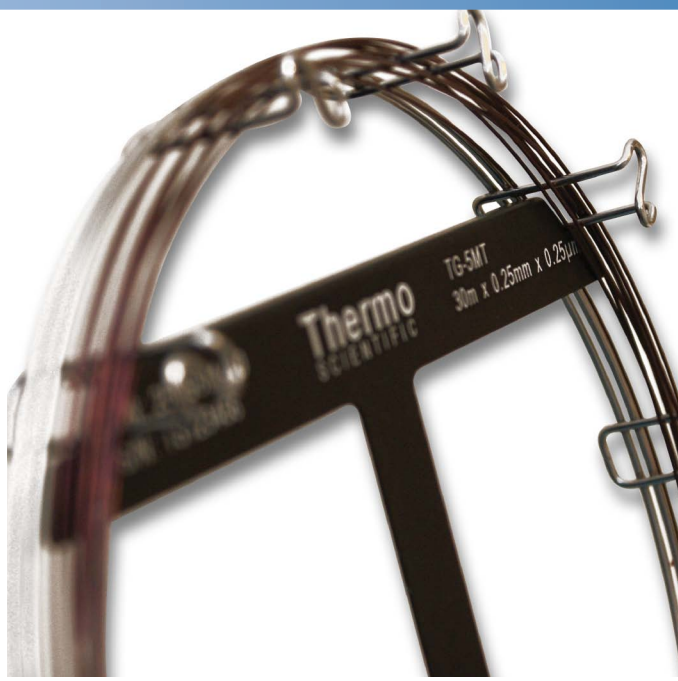
To demonstrate the relative selectivity of the two columns a standard of FAMEs C8–C24 was analyzed on both a fused silica (TraceGOLD TG-WaxMS™) column and a metal (TG-WaxMT™) column with the same dimensions. The performances of these columns was then compared.

Experimental Details

Consumables

FAMES C8–C24 in methylene chloride containing:

1. Methyl octanoate
2. Methyl decanoate
3. Methyl laurate
4. Methyl myristate
5. Methyl palmitate
6. Methyl palmitoleate
7. Methyl stearate
8. Methyl oleate (cis-9-oleic methyl ester)
9. Methyl linoleate
10. Methyl linolenate
11. Methyl arachidate
12. Methyl behenate
13. Methyl erucate (Methyl cis-13-docosenoate)
14. Methyl lignocerate (Methyl tetracosanoate)



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Separation Conditions		Part Number
Instrumentation:	Thermo Scientific TRACE™ GC	
Column 1:	Thermo Scientific TraceGOLD TG-WaxMT 30 m × 0.25 mm × 0.25 µm	26M88-1420
Column 2:	Thermo Scientific TraceGOLD TG-WaxMS 30 m × 0.25 mm × 0.25 µm	26088-1420
Septum:	BTO 17 mm	31303211
Liner:	Split Straight Liner 3 mm I.D.	45350033
Column ferrules:	Graphite ferrules to fit 0.25 mm ID columns	29053488
Injection syringe:	10 µL Fixed needle 50 mm cone tip	36520060
Vials and closures:	9 mm Screw cap vial	60180-509
Carrier gas:	Helium	
Column flow:	1.2 mL/minute (constant flow)	
Oven temperature:	120 °C (0.5 min), 30 °C/min to 250 °C (10 min)	
Injector type:	Split/splitless	
Injector mode:	Split	
Split ratio:	25:1	
Injection volume:	1 µL	
Injector temperature:	250 °C	
Detector details:	FID 300 °C	

Data Processing	
Software:	Thermo Scientific Xcalibur™

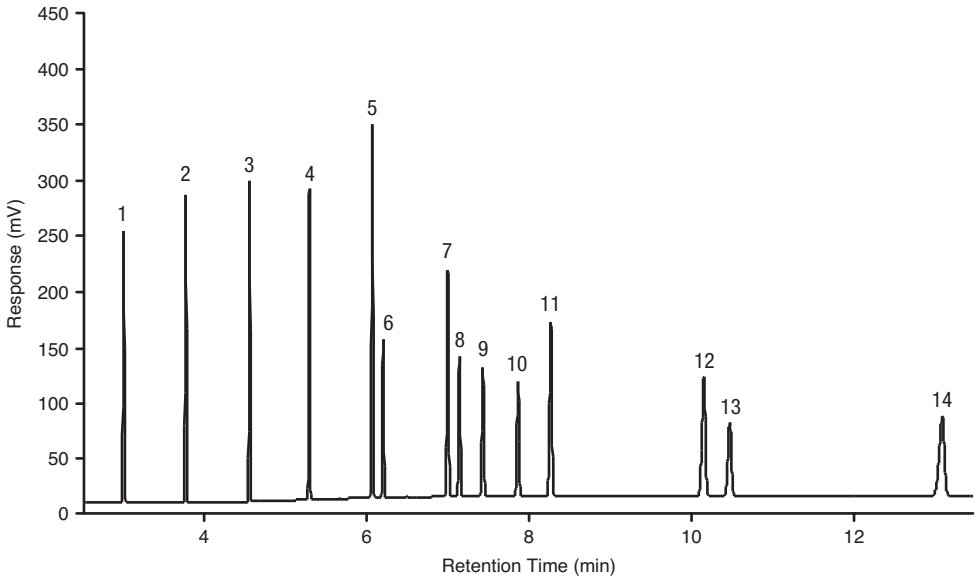

Figure 1: 1% C8–C24 FAMES solution separated on a TraceGOLD TG-WAXMT metal GC column

Results

The selectivity of the C8–C24 FAMEs using a metal column (Figure 1) was highly comparable to that obtained using a conventional fused silica column (Figure 2).

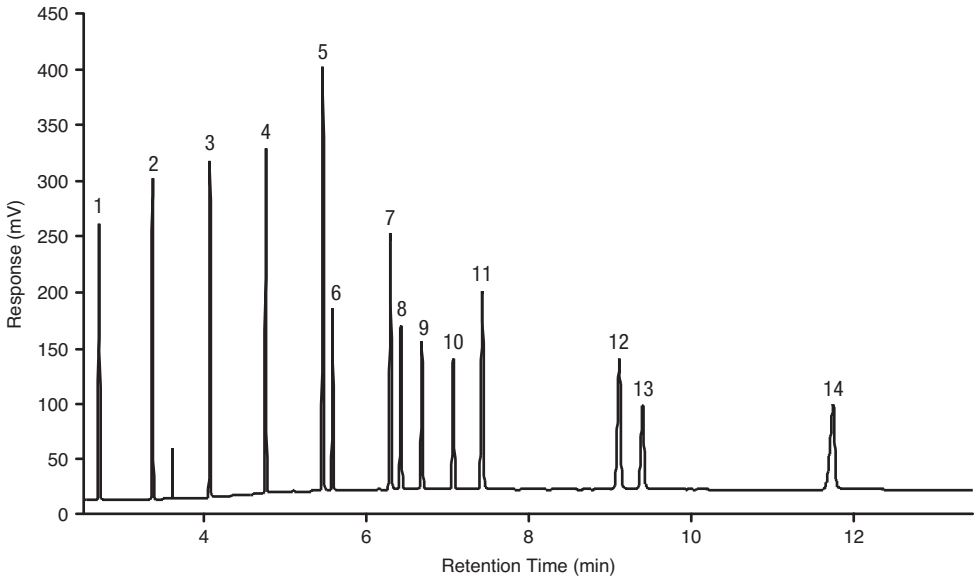

Figure 2: 1% C8–C24 FAMES solution separated on a TraceGOLD TG-WaxMS fused silica GC column

The retention time discrepancy between the new metal column and the used fused silica column was due to the slightly longer length of the metal column. As it was new, no column trimming had been performed as routine maintenance. This had no impact on peak resolution.

Conclusion

Chromatographic performance is not altered when selecting a TraceGOLD TG-WaxMT column over the equivalent TG-WaxMS column.

The increased physical robustness of the metal column means that a longer lifetime may be observed due to the columns being less prone to accidental breakage.

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USA and Canada +1 800 332 3331
France +33 (0)1 60 92 48 34
Germany +49 (0) 2423 9431 20 or 21
United Kingdom +44 (0)1928 534110
Japan +81 3 5826 1615

China +86 21 68654588 +86 10 84193588
+86 20 83145199 800 810 5118
India +91 22 6742 9494 +91 27 1766 2352
Australia 1 300 735 292 (free call domestic)
New Zealand 0800 933 966 (free call domestic)
All Other Enquiries +44 (0) 1928 534 050

Technical Support
North America +1 800 332 3331
Outside North America +44 (0) 1928 534 440

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