APPLICATION NOTE

Determination of Free and Total Glycerine and mono-, di-, triglyceride content in B-100 Biodiesel Methyl Esters according to EN 14105

AN078v2; Nov 2023, SCION Instruments

Introduction

The European Standard method, EN-14105, is used to determine the free glycerol and residual mono-, di- and triglyceride contents in fatty acid methyl esters (FAME) typically intended for addition to mineral oils. Total glycerol content is calculated from the results obtained. The method is suitable for FAME from rapeseed, sunflower and soybean oils, but is not suitable for FAME produced from or containing coconut and palm kernel oils due of the problem of peak overlapping. This method and ASTM D6584 are two of the most used standardized analytical methods used for the analysis of biodiesel.

Experimental

The SCION Biodiesel analyser for EN 14105 is based on our 8300-GC platform, a cold-oncolumn injector, a SCION-Glycerides Inert Steel analytical column with a 2m retention gap and a High-Temp FID Detector. Analytical conditions for the EN 14105 analysis can be found in table 1.

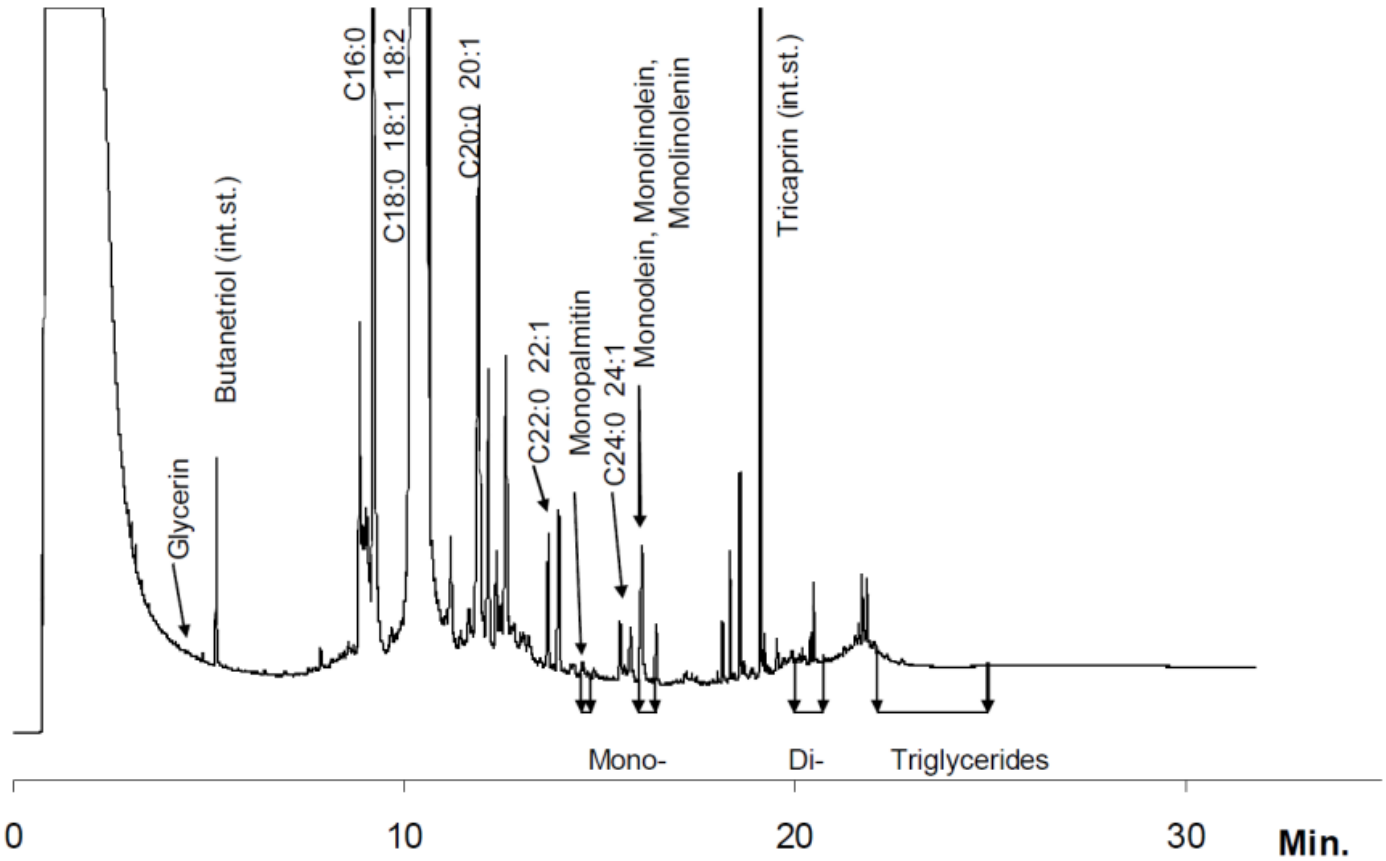

Figure 1. Biodiesel Chromatogram

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Table 1 GC conditions

Parameter	Settings
Injector	Cold-on-Column
Injection Volume	1µl
Column	10m x 0.32mm x 0.10µm SCION-Glycerides Inert Steel (SC38613) w/ Ret. Gap
Carrier Gas	Helium @ 80 kPa
Oven Program	Start @ 50°C (1 min) 15°C/min to 180°C 7°C/min to 230°C 10°C/min to 370°C End @ 370°C hold 10 min.
Detector	FID @ 380°C
Software	Compass CDS

Sample Preparation

Calibration mixtures and internal standard solutions were prepared according to the method. 100 mg of homogenized sample was accurately weighed in a 10 mL vial. Then, using a glass syringe, the following was added to the vial: 10µL of internal standard No. 1 stock solution, 100 µL of internal standard No. 2 stock solution and 100µL of MSTFA. Care was taken to ensure there was no contact with moisture. The vials were hermetically sealed and shaken vigorously. After storing the vials at room temperature for ~ 15 minutes, 8 mL of heptane was added to each. Then, 1 µL of the reaction mixture was automatically injected into the gas chromatograph according to the instrumental conditions described below (see Table 2 for typical results).

Ordering Information

Ordering Information for the 8300 GC	
Part	**Part Number**
8300-GC, with S/SL inlet and FID detector (120V)	839001701
8300-GC with S/SL inlet and FID detector (230V)	839001702
8400 PRO Autosampler for 8300 and 8500 GC	840000001
Suggested Consumables	
Part	**Part Number**
15% Graphite/85% Vespel Ferrule 1/16" with 0.4 mm hole pk/10	41312148
BTO Septa 9 mm, pk/50	CR298713
10 µL fixed needle syringe, 5 cm, 0.47 mm OD, 26 g conical needle	41312133
Vial, 9-425 Screw Thread, 2 mL Clear Glass 12 x 32 mm Flat Base with Label, pk/100	41311000

References

1. Example

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