



Oleic Acid

Using Nitrogen as a Carrier Gas



Edible Oil F.A.M.E. Profiling Using Nitrogen as Carrier Gas

This application shows that by using the EL-CN100 column, the same results can be shown when using nitrogen as a carrier gas for the separation of Oleic acid on the Ellutia 200 Series Gas Chromatograph.

Fatty acid profiling is the process of analysing ratios of individual fatty acid content within an oil sample to generate the authenticity as well as nutritional information for labelling requirements.

As Olive Oil is a very valuable commodity, adulteration with cheaper oils, e.g. Hazelnut or sunflower can occur. This clandestine practice has raised concerns for the edible oils industry as a whole, with manufacturers and wholesalers keen to confirm the authenticity of the products being bought and sold.

The Ellutia 200 Series, FID, Gas Chromatograph (GC) was used in this application. Its small footprint makes it ideal for laboratories of any size. The EL-CN100 column came on a 5" cage, a great space saver, essential for busy or small laboratories.

The most commonly analysed are Olive and Sunflower Oil. Both oils contain primarily different ratios of Oleic Acid (C18:1) and Linoleic Acid (C18:2), but can contain a variety of saturated and unsaturated fatty acids ranging from Palmitic Acid (C16:0) to Behenic Acid (C22:0).

To analyse these oils, they must first be derived to their F.A.M.E. (Fatty Acid Methyl Ester) equivalent. Many commercially available derivatisation kits are suitable for this process.

Sample Preparation

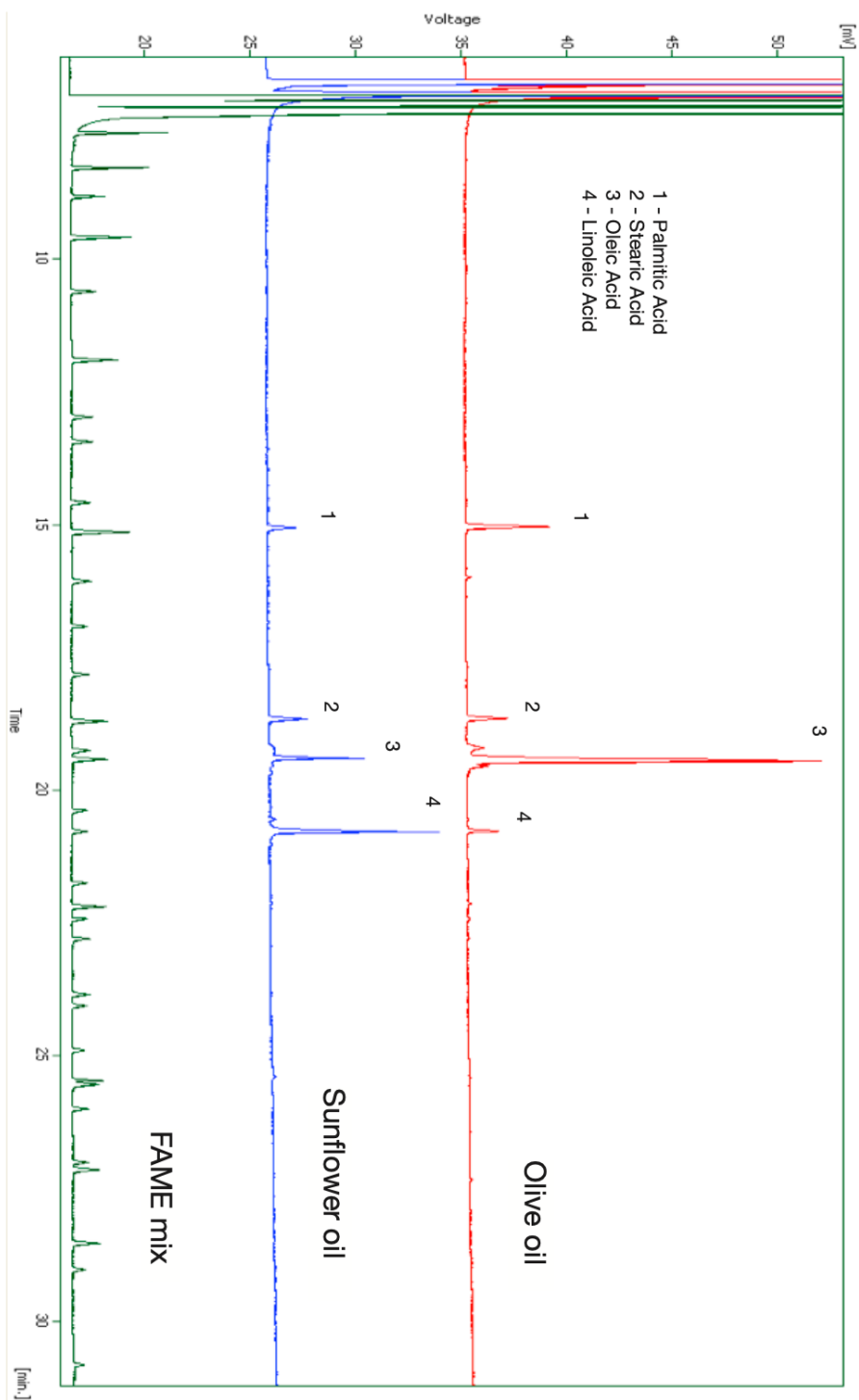
- Weigh 1-25 mg of sample into reaction vessel (20 ml Vial and Screw Cap), add 1 ml of Toluene (>99% C₇H₈).
- Add 2 ml 10% v/v Sulfuric acid in Methanol (H₂SO₄(l) in MeOH) and shake.
- Seal vessel and heat for 30 minutes at 60°C.
- Allow to cool to room temperature, then add 1 ml Saturated Sodium Bicarbonate solution (<99.7%, 10 g per 100 ml of deionised water) and 1 ml hexane (>95%).
- Shake and allow the layers to separate. Pipette top layer into another vessel and add 1g Anhydrous Sodium Sulfate (>99%), shake and wait for 5 minutes. Decant sample into a clean vial and analyse a 1 µl injection.

GC Conditions

Injector Temperature:	250°C
Carrier Gas Type:	Nitrogen
Carrier Gas Control Method:	Simultaneous Constant Flow
Column Flow:	1.5 ml/ min ⁻¹
Split Flow:	1.5 ml/ min ⁻¹
Injector Volume:	1µl
Column Type:	EL-CN100 60 m x 0.25 mm x 0.2 µm

Temperature Program

Initial Temperature:	140°C (hold for 2 minutes)
Ramp 1:	200°C (10°C min ⁻¹)
Ramp 2:	240°C (1°C min ⁻¹) hold for 30 minutes
Detector Temperature:	250°C



Column used - ELR-CN100 60 m x 0.25 mm x 0.20 µm film thickness

	Peak Areas (mV.s)		% Composition		Ratio	
	Olive Oil	Sunflower Oil	Olive Oil	Sunflower Oil	Olive Oil	Sunflower Oil
Palmitic Acid (C16:0)	12.1	3.8	12.0	6.2	3	1
Stearic Acid (C18:0)	5.8	10.1	5.8	16.4	1	3
Oleic Acid (C18:1)	78.0	19.2	77.6	31.2	17	5
Linoleic Acid (C18:2)	4.6	28.5	4.6	46.3	1	7

Ordering Guide

Main Instruments	
Ellutia 200 Series Gas Chromatograph, FID	(Part no. 20500130)
EL-CN100 60 m x 0.25 mm x 0.2 µm	(Part no. 51100878)
Ellution Software - Single Instrument	(Part no. 23001001)
Liquid Autosampler	
Ellutia EL3100A Automatic Liquid Autosampler - 15 position	(Part no. 30500011)
Ellutia EL3000A Automatic Liquid Sampler - 121 position	(Part no. 30500010)
Ellutia EL3200A Automatic Liquid Sampler - 209 position	(Part no. 30500012)
Autosampler Control Software	(Part no. 23001012)
Accessories	
1 µl Liquid Syringe	(Part no. 20511204)
2ml Short-cap Screw Thread Vials	(Part no. 20511101)
2 ml Vials screw Caps	(Part no. 20511107)
Septa	(Part no. 20512101)



To learn more about Ellutia's 200 Series GC, please visit:
<https://www.ellutia.com/200-series-gas-chromatograph>

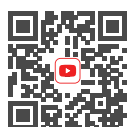


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