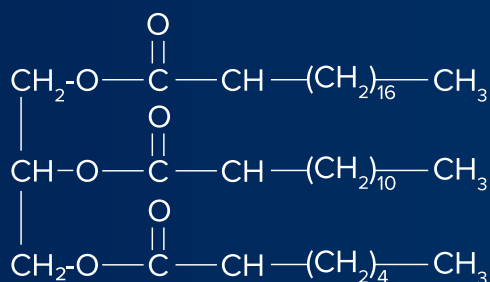


NMF Analyser

Milk is considered as a balanced and nutritious food with good fats which can be easily digested. Milk fat contains useful quantities of vitamins and a large variety of lipids and fatty acids. It is also responsible for the smooth taste of dairy products.

Fats are made from individual fatty acid molecules attached to glycerol, a 3-carbon backbone. The most common type of fat is called a triglyceride, or triacylglycerol, which contains 3 fatty acids. Because there are many different fatty acids there are many different types of triglycerides or fats.



Triglyceride

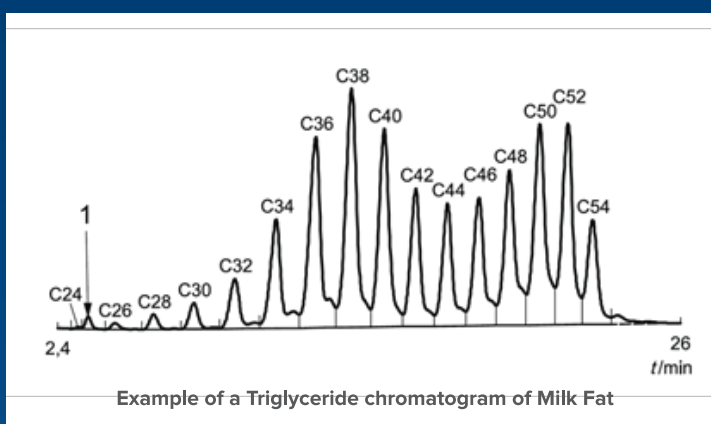
Milk fat has the most complex fatty acid composition of the edible fats. Over 400 individual fatty acids have been identified in milk fat. However, approximately 15 to 20 fatty acids make up 90% of the milk fat. The major fatty acids in milk fat are straight chain fatty acids that are saturated and have 4 to 18 carbons (4:0, 6:0, 8:0, 10:0, 12:0, 14:0, 16:0, 18:0), monounsaturated fatty acids (16:1, 18:1), and polyunsaturated fatty acids (18:2, 18:3). Some of the fatty acids are found in very small amounts but contribute to the unique and desirable flavour of milk fat and butter. For example, the C14:0 and C16:0 β -hydroxy fatty acids spontaneously form lactones upon heating which enhance the flavour of butter.

Milk and milk products are extensively consumed by children, adults and elders. Because of the increasing demand of milk, milk fat has often been adulterated for commercial gains. Even partial replacement of milk fat by low-priced vegetable oils, animal fats or even margarine has offered economic advantage. This addition of non-milk fats such as vegetable oil or animal fats is an illegal practice and has become increasingly common and complex. Consuming non-milk fats like vegetable oil derived from untreated and unknown sources has been established as a health hazard. Detecting and Quantifying of these non-milk fat constituents is now possible with the NMF Analyser.

Fatty acid composition of milk fat has long been used as a criterion to detect adulteration with vegetable oils, mainly because milk fat is characterized by short-chain fatty acids, whereas vegetable oils have medium- to long-chain fatty acids. Based on this knowledge, studies related to the detection and quantification of non-milk fats in milk and dairy products in 2006, it was reported that foreign fats in milk fat can be detected by analysing triacylglycerol by gas-liquid chromatography using the standardized methodology. Triacylglycerol determination has also been proposed as a means to detect mixtures of foreign fats in milk fat and has been considered as an official method for assessing milk fat purity.

NMF Analyser manufactured in India is marketed by IndiFOSS. Since 2013, IndiFOSS has established itself as one of the flag bearers of milk, dairy and food quality and safety in India. IndiFOSS offers products, solutions, technical and analytical services for challenging problems related to food safety in India.

NMF Analyser is a dedicated non-milk fat analyser based on ISO 17678, IDF 202 method for determination of milk fat purity in Milk and milk products.



Fat extracted from milk or milk products is analysed by gas chromatography (GC) using a packed or a short capillary column to determine triglycerides (TGs), separated by total carbon numbers. By inserting the mass fraction, expressed as a percentage, of fat molecules of different sizes (C24 to C54, using even C numbers only) into suitable TG equations, S-values are calculated. If the S-values exceed the limits established with pure milk fat, the presence of foreign fat is detected.



Specifications – NMF Analyser

Column Oven

Size	H 290 mm x W 280mm x D 160mm
Volume	14 Liters
Temperature	5°C above the ambient temperature to 400°C
Ramp Rate	1°C to 50°C per minute
No. of Ramps	10
Cooling Rate	250°C to 50°C within approx.5 minutes at 25°C room temperature
Temperature Gradient	2°C max (on 200 mm dia. circumference,40mm from the sensor)
Temperature Accuracy	+ 1 % of set value from 50°C to 400° C
Heated Zones	3 Independent heated zones up to 400°C for individual control of injector, detector & oven

Injection System

Split/split-less (capillary column) injector. Temperature range settable up to 400°C. in the steps of 1°C
Injector pressure range 0 to 450 KPA Constant Pressure or Constant flow with manual septum purge and split flow control.

Pneumatics

Carrier gas thru Electronic Programmable Pressure Controller (EPPC). Pressure regulators for Hydrogen, Air and Make-up gas. Pressure switch to cut off mains power supply in the event of depletion of carrier gas flow for heated zones.

Detector

High sensitivity flame ionization detector with auto flame ignition, Temperature range settable up to 400°C. in the step of 1 °C. Dynamic range 10^7 . Minimum Detection Level equivalent 3pg C/sec of Dodecane.

Display

80 Characters (20 X 4 lines) LCD.

Keyboard

32 Keys for setting of the parameters and eight status LCD for oven ramp status.
4 External event control relay output
2 Logic inputs and 2 logic outputs

Power Requirement

230V Ac $\pm$ 10V Ac

Dimensions and Weight

Size : 515 (W) X 450 (H) X 535 (D) mm
Weight: 36 kg. (approx.)

Software

Integration

There are extensive possibilities for modifying chromatograms. The chromatogram can be changed by entering global parameters or interactively, through the direct graphical modification of the baseline.

Overlay

Simultaneously displays a virtually unlimited number of chromatograms and their mathematical modification; for example, mutual deductions or derivations of any order.

Calibration

Internal and external standard calculation methods, calibration of groups of peaks and reference peaks method for better identification.

Automated Measuring Support

Sequence tables for any set of samples with or without an autosampler.

Post-Run

Automatically displays, prints, exports and starts other programs after completion of measurement.

Summary Result Tables

Displays and prints selected results from all simultaneously displayed chromatograms.

User Settings

User selects parameters for peak display and the specification for axes, including colour from an extensive array of colour settings. Text labels and lines, either as part of the area or anchored to a chromatogram, may also be inserted.

Summary Result Tables

Displays and prints selected results from all simultaneously displayed chromatograms.

User Settings

User selects parameters for peak display and the specification for axes, including colour from an extensive array of colour settings. Text labels and lines, either as part of the area or anchored to a chromatogram, may also be inserted.

Export

Optional exportation of all results with or without the chromatogram, in various formats, into a file or clipboard.

Import

Imports chromatograms or mathematical curves, which have been saved in text or AIA formats, from other programs.

Method And Calibration History

Imports chromatograms or mathematical curves, which have been saved in text or AIA formats, from other programs.