Fatty Acid Analyzer

In the food industry, the quality management for products is conducted by analyzing esterified fatty acids to determine the ratio of saturated and unsaturated fatty acids in fat.

There are numerous kinds of fatty acid analysis such as fatty acids in edible oils (ex-sesame oils), recently brought up social issue- trans fatty acids, omega 3 fatty acids (refined fish oils) in healthy functional food, etc.

For fatty acids have many isomers to be separated, they are commonly analyzed by gas chromatograph after esterified to Fatty Acid Methyl Esters (FAMEs) to avoid peak tailings by a direct injection of fatty acid and column clogging.

It's very important to set an optimal oven program because the polar or moderately polar capillary columns used in this analysis have low temperature limit.

The recommended column for the analysis of fatty acids in edible oils is polar capillary columns such as Omegawax of Innowax, and for trans fatty acids is moderately polar capillary columns such as HP-23 or SP-2560 to separate cis/trans isomers. The order of peaks must be indentified first for the eluted peaks of fatty acids are different in the use of polar or moderately polar capillary columns.

YL Fatty Acid Analyzer is suitable to analyze various fatty acids and provide all the solution from preparation of sample to analysis.

• Useful Information

1) Sample preparation

(1) Sample

- **Lipolysis :**
  Sample 25mg ➞ Add 0.5N **NaOH methanol** solution 1.5 ml and mix
  ➞ Heat at 100 °C for 5 min ➞ Cool down to 30-40 °C

- Fatty Acids Esterification:
  ➞ Add 14 % Trifluoroborane methanol solution 2 ml and mix
  ➞ Heat at 100 °C for 2 min
  ➞ Cool down to 30-40 °C, add 1 ml of hexane (or heptane) and stir it for 30 sec.
  ➞ Add 5 ml of saturated NaCl solution and stir
  ➞ Separate layers at the ambient temperature
  ➞ Use an upper layer (Hexane or hexane layer) as a sample

(2) Standard

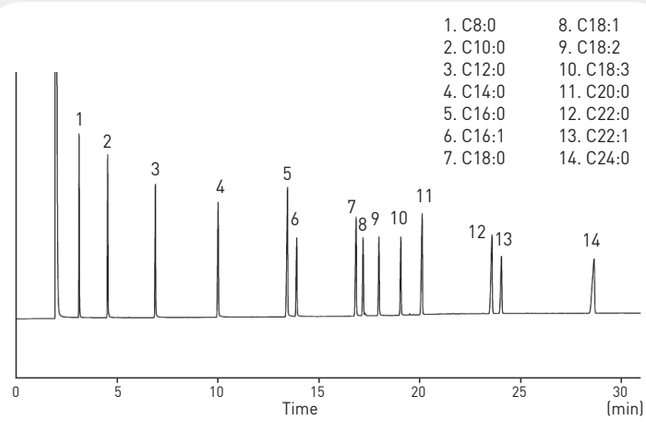
Fatty acids in edible oils –14 kinds of Fatty acid methyl ester mix
Trans fatty acids- 37 kinds of Fatty acid methyl ester mix
cis, trans isomer standard of 18:2, 18:3
Omega 3 fatty acids – DHA, EPA standard

• Application

- Fatty acids in edible oils
- Trans fatty acids
- Omega 3 fatty acids (DHA, EPA)

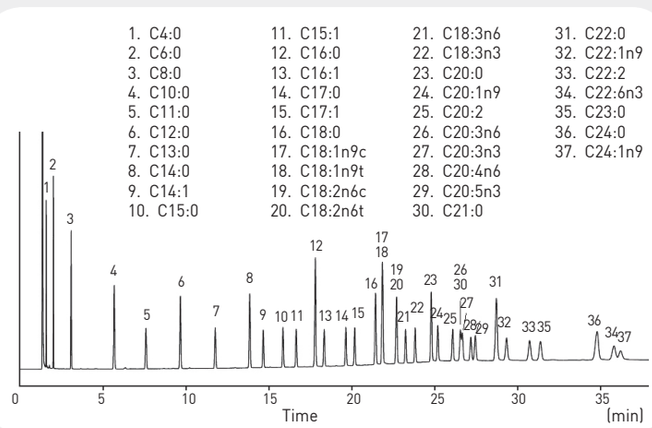
■ Fatty Acid Methyl Esters (FAMEs)

- Oven : 140 °C (1 min) ➞ 5 °C/min ➞ 240 °C (5 min)
- Column : HP-INNOWAX (30 m, 0.25 mm, 0.25 μm)
- Carrier gas : He, 1.0 ml/min (Split ratio 20:1)
- Injector : Capillary 250 °C
- Detector : FID 250 °C
- Injection volume : 1 μl (Liquid)



■ Fatty Acid Methyl Esters (FAMEs)

- Oven : 140 °C (5 min) ➞ 5 °C/min ➞ 240 °C (20 min)
- Column : HP-INNOWAX (30 m, 0.53 mm, 1.0 μm)
- Carrier gas : He, 5.0 ml/min (Split ratio 20:1)
- Injector : Capillary 250 °C
- Detector : FID 250 °C
- Sample : Fatty Acid Methyl Esters
- Injection volume : 1 μl (Liquid)



■ DHA & EPA in Refined Fish Oils

- Oven : 200 °C (Isothermal)
- Column : HP-INNOWAX (30 m, 0.53 mm, 1.0 μm)
- Carrier gas : He, 7.0 ml/min (Split ratio 10:1)
- Injector : Capillary 250 °C
- Detector : FID 250 °C
- Sample : Refined Fish (Preparation : FAME)
- Injection volume : 1 μl (Liquid)